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NOTE.—Communications relative to the editorial management should be addressed to Mr. ROTHWELL. Articles written by Mr. RAYMOND will be signed thus *
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## OUR WESTERN OFFICE AT DENVER, COLO.

Gen. FRANCIS L. VINTON, Mining Engineer, is in charge of the Western Office of the ENGINEERING AND MINING JOURNAL, at Denver, Colo. Communications relating to the business of his department can be addressed to him at Denver. Correspondence for the ENGINEERING AND MINING JOURNAL should be addressed to the Editor in New York.

## ANNOUNCEMENT.

THE Scientific Publishing Company (publisher of the ENGINEERING AND MINING JOURNAL) has acquired an interest in and undertaken the publication of the *Polytechnic Review*, weekly; the *Workshop* monthly, and the *Brick and Pottery Journal*, monthly, heretofore published in Philadelphia by the proprietors, Messrs. WAHL & GRIMSHAW.

The editorial management of the three papers mentioned will still continue in the very able hands of Drs. WAHL and GRIMSHAW; and since these gentlemen will now be able to devote their entire attention to this department, being freed from the cares of the business management, these popular papers will become still more attractive and instructive. It is the intention of both publisher and editors to make these papers not only the most reliable but the most popular and instructive journals of their classes in the language. They will be profusely illustrated, and will contain information of such practical value as to make them indispensable to all interested in Popular Science, or the Mechanic Arts—and more especially to manufacturers.

Their low cost—$3 a year for the *Polytechnic Review* (weekly), and $1 a year for each of the monthlies—will put them within the reach of every reading man in the land.

## TRACING AN UNDERGROUND STREAM.

There are many cases, in various parts of the world, where the whole or part of a stream suddenly disappears from sight, and, in some instances, the place of its re-appearance is unknown, or, at best, but a matter of conjecture. It is a common experiment, where the waters of a river make a plunge and re-appear at a short distance, to throw chaff into the upper waters, and note its appearance upon the surface of the lower. It having been supposed that a portion of the water of the upper end of the Danube went to feed the River Aach, an affluent of Lake Constance, and some ten miles distant from the Danube. Prof. KNOP, of Carlsruhe, improved and greatly beautified this experiment by emptying into the Danube some fifteen gallons of fluorescene (a very powerful green coloring material), of which $\frac{1}{100000000}$ part will impart a perceptible color to water. In about sixty hours the waters of the Aach began to show a marked green color, which continued for a day, and, although the current of the Aach passes 1,500 gallons per second, was so pronounced as to alarm the inhabitants.

## THE WEAR OF RAILROAD TIES.

In discussing the question of the economy of telegraph poles and railroad ties by means of antiseptic liquids (creosote, corrosive sublimate, salts of zinc, copper, etc.), the point is often raised, in the case of the ties, that there is no advantage in so treating them that they will remain unrotted from ten to twenty years, because they "cut out" much sooner than that, by the wearing of the chair, drawing and working of the spikes, etc. At first blush, this point seems well taken, and it often causes the rejection of the preservation scheme. It should, however, be borne in mind that the cause of the chair cutting and bedding into the tie, and of the spikes working loose, and hence ceasing to hold, is mainly a local rotting of the tie in those places (namely, under the rail-flange and the spike-heads) where moisture is apt to collect and be held. With treated ties, local rotting is retarded in the same proportion with general decay, as in ordinary untreated sleepers, and the advantages of the antiseptic treatment are hence by no means seriously diminished by the cutting and wear of the chairs and spikes.

## A FLYING VISIT TO COLORADO

A trip over the great plains to the Far West at this season of the year is not expected to be very agreeable or attractive, but when the trip happens to be made for the first time there is a certain fascination in those interminable, dreary plains which compensates in a measure for the wearying monotony of the treeless expanse of uniform gray—and with what pleasure one at last welcomes the bright snow-capped mountains which announce at once the end of the monotonous plains and the home of the "bonanza." As the train carries us from Cheyenne to Denver we rarely remove our eyes from the snowy range which lies on our right. It is scarcely possible to imagine anything more beautiful than these snow-capped hills rising abruptly from the sunlit plain till the summits of many of the distant peaks are lost in clouds and snow. The sun, as it sinks behind these heavy banks of white clouds, from which in places the snow is falling, illumines their edges with the glittering brightness of molten silver and imparts to the scene a glory which cannot easily be forgotten. Nevertheless, these mountains are disappointing. The foot hills which rise abruptly from this great prairie are of but very moderate height, and yet they screen the great giants which stand so far away in the distance that their true altitude is not appreciated. Were it not that these mountains lie on the very edge of the vast and dreary plains, beautiful as they are, they would certainly not at this point excite the boundless admiration they do.

Our surprise was great to find the air warm, the ground quite free from snow, and the farmers industriously plowing their fields in the middle of February. There was not, however, the slightest sign of greenness anywhere, and, were we not aware that these parched and unpromising fields do blossom like the rose and produce fruitful crops under the influence of the Spring rains and the artificial irrigation, we could well believe ourselves in the famous Bad-lands, or on the deceitfu alkali deserts that lie still further toward the setting sun.

### DENVER.

The praises of Denver—said to be the pleasantest city between Chicago and San Francisco—have been chanted so often, there is no occasion to revert to them at length here. During a week's stay there we enjoyed the most delightful weather. So warm, indeed, was it, that not only were overcoats discarded, but during the middle of the day the shady side of the street was sometimes sought for comfort, and if the afternoon breeze does occasionally fill the air with clouds of dust, and obscure our view of the blue sky, it is doubtless only as a reminder of our earthly origin and destination, lest we should imagine ourselves in an enchanted land, and forget the "toil and trouble," which are our portion in this lower world.

Denver is the metropolis of the Centennial State, and though not a mining town, it looks to the mining districts which lie to the west of it for its chief support. It is the headquarters of the mining interests, and in all probability will one day become a great metallurgical centre. Prof. HILL is about removing his extensive smelting works from Black Hawk to Denver, for the purpose of securing a greater variety and better supply of ore, cheaper fuel, and a more abundant supply of labor. The advantages to be gained by this transfer are estimated at a very large sum yearly, and it will certainly be also an immense benefit to Denver. The question of railroad freights is the only serious difficulty in the way of the establishment of smelting works at this point, the roads under the control of the Union Pacific discriminating in freights against Denver to such an extent as to make the rates the same, or nearly the same, from the mines at Georgetown, Black Hawk and Central to Denver—say 50 miles—as from the same points to Omaha—some 650 miles. This suicidal policy (killing the goose that lays the golden eggs) will chiefly and certainly injure those who adopt it. It may, it is true, for a time divert some of the business from its natural and most advantageous channels, but if persevered in, it will undoubtedly lead to the building of rival roads, and then the rates will become so low, that with a divided business, neither road will pay. Prof. HILL, in his own practical manner of solving difficulties, proposes

building a road himself from Denver to Black Hawk and Georgetown, and since his large means would enable him to do so, there is a fair prospect that either freights to Denver will be greatly reduced—to him at least—or this new outlet for the mines will be built.

The excitement of the day in Denver, and, indeed, in the entire State of Colorado, is the enormously rich deposit of argentiferous lead ore—chiefly carbonate of lead—in California Gulch, or Leadville as the camp is now designated. This remarkable mineral deposit is certainly one of the most important yet discovered in this country. In some places the carbonate of lead containing from ten to more than one thousand ounces of silver to the ton is dug up as sand, a sand which had long been known to prospectors, but, like the black silver ore of Lake Superior was not recognized as of value till recently. Now the mountains, though covered with snow, are dotted everywhere in the vicinity of Leadville with indefatigible prospectors, some five or six hundred of whom have collected there from all parts of the country. The ores are very peculiar in appearance, some of them resembling iron ore, and they are found in some places in great abundance. Massive beds, as great as 20 feet in thickness, being already opened, and it is claimed that ore containing from 30 to 100 ounces of silver and a high percentage of lead can be mined and delivered "at grass" for $3 a ton.

We gave in our number of January 19 a detailed description of these deposits. Their geological character is attracting much attention, and, as is invariably the case with very valuable mining property, they have fallen among—the lawyers.

The prevailing opinion is that the deposit resembles in many of its features the Great Eureka-Richmond lode in Nevada, and that the recent decision, in which it was maintained that the whole mineral-bearing bed constitutes the lode, may be applied to this case. Though the lead thus far found has been as a contact deposit between porphery and limestone, the correspondence referred to above classes them as sedimentary beds of the nature of bog iron ore. The suits already in the hands of the lawyers will no doubt call for the best expert testimony that can be obtained, and there is a fair prospect that they will lead to full enlightenment of a most interesting geological question, and, whatever these mines may prove to the miners, they will certainly prove a very "bonanza" to the lawyers.

Though many of the prospective millionaires who own claims on the Leadville bonanza are men who but yesterday were happy in the possession of a mere "grub stake," yet some shrewd and knowing capitalists have purchased prospects there, and, as a true representative of his constituents, the genial executive of the Centennial State, Gov. ROUSE, is the happy possessor of some very promising locations; indeed, we believe he has "struck it rich" already.

### GEORGETOWN.

Having been disappointed in finding nothing but summer brightness in Denver, and wishing also to get even a brief glimpse of the mines, we paid a visit to Georgetown, a city surrounded by mines, some of which are ranked among the richest in the State. Georgetown is a very enterprising and lively town, and, judging from the large and enthusiastic audiences that greeted the famous *prima donna*, Mlle. ILMA DE MURSKA, whom we had the good fortune to meet there, it appears to be a place of high cultivation. As with most of the Western towns, the inhabitants, with few exceptions, appear to be given over wholly to the Silver frenzy—too bad for so intelligent a community—and during our visit were firing guns in celebration of the passage, by the United States Senate, of the Silver bill. So infatuated did these simple mountaineers appear with "the little dollar of our daddies" that it would seem quite useless to try and convert them from the error of their ways; indeed—foolish people—they are quite convinced that they are right and *we wrong*, which is very absurd on their part, for *of course* all who disagree with (each of) us are always wrong. Nevertheless these Georgetonians are right good fellows, and since they have now got it all their own way on the Silver question—though we will never, never admit they were in the right—we congratulate them on gaining their end. Now, let us see how the country will spring into a new life, and we call upon them and all other Silver men to make good their promises in this respect.

Georgetown is prosperous even now, though the output of its mines is somewhat less than it was a year ago, owing, it is said, to the fact that some mines (the Pelican, for example), which were formerly in rich ore, are now in poor ground, and others are hindered in their output by law suits. The *Terrible*, an Anglo-American company, is working a splendid body of ore in a part of the mine we visited, and, being under able and honest management, is a notable exception to the rule which has made so many British-owned mines disastrous to their stockholders and their management a by-word in this country. As we shall shortly publish a series of illustrations of the principal mines and mills in this district we shall not now refer to these, but it is impossible to close this without reference to the perfect arrangement down to the minutest detail of Mr. W. W. ROSE & Co.'s concentration mill. Though not a very large establishment, this is one of the best arranged—from its Blake crusher above to its Rittingen tables below—that we have ever seen. Unfortunately, it was idle at the time of our visit—suffering from the chronic malady of mining districts—though it would be difficult to find a safer or more remunerative investment for capital than a well-located and arranged concentrating mill.

## NEW PUBLICATIONS.

GEOLOGY OF WISCONSIN. *Survey of* 1873-77. *Vol. II.—Part I. Historical; II. Eastern Wisconsin; III. Central Wisconsin; IV. Lead Region. Accompanied by an Atlas of Maps.* 1877. Royal 8vo., 768 pp.

ANNUAL REPORT OF THE WISCONSIN GEOLOGICAL SURVEY, *for the Year* 1877. *By* T. C. CHAMBERLIN, *Chief Geologist*, Madison, Wis., 1878.

Of these publications, the handsome octavo first named is part of the permanent series presenting the final results of the survey. Although numbered as the second, it is in order of time the first volume of the final report. The historical part contains the reports of progress of the late Dr. I. A. LAPHAM, the first State Geologist under the present law, for the years 1873 and 1874, and that of Dr. O. W. WIGHT, his successor, for 1875. Mr. CHAMBERLIN'S own report for 1876, having been elsewhere published, is omitted.

Previous to the commencement of this survey, various parts of Wisconsin had been more or less thoroughly examined. The first government work of the kind was that of *Featherstonhaugh*, who, after visiting in 1834-5 the lead mines of Missouri, and making what Dr. WIGHT bluntly calls "a perfectly worthless report," was employed as U. S. Geologist to make a general reconnoissance of the Northwest, and distinguished himself by referring the whole series of Lower Silurian rocks in the lead region of Wisconsin, and up the river to the Falls of St. Anthony and beyond, to the carboniferous limestone, The really scientific, though hasty, survey of D. D. OWEN was made for the General Land Office in 1839. Dr. OWEN began in September with 139 assistants and finished the work the same year. The report was printed in 1840 and reprinted in 1844. He was subsequently charged with the geological survey of the Chippewa land district, and in 1851 his admirable final report, with a geological map, including the State of Wisconsin, was made public. In 1853 Mr. DANIELS was appointed State Geologist. He made a report of 50 pages, which was printed in 1854, the year in which he was succeeded by the gifted but eccentric Dr. G. G. PERCIVAL. The latter published one report of 100 pages, and left incomplete a second, which was published in 1856. In 1858 Col. WHITTLESEY, and in 1859 Prof. WHITNEY, began field work, under the commission of which Prof. JAMES HALL became the head. The first volume of Prof. HALL'S report, containing WHITNEY'S excellent account of the lead region, was published in 1862. The second volume, said to contain the report of Col. WHITTLESEY on the iron region in the northern part of the State, has been ready for publication some fifteen years; but an unfortunate disagreement between the Legislature and the author has substituted litigation for publication, and science and industry have both been losers. From the brief account given by Dr. WIGHT, we should infer that Prof. HALL has the right in the dispute; but certainly the value of his work to the State would outweigh the whole sum at issue. In addition to these public works, there is a considerable list of scientific monographs bearing on the geology and natural history of the State, for which we refer the reader to Mr. CHAMBERLIN'S general report, p. 95.

Of Dr. LAPHAM'S assistants, Mr. CHAMBERLIN is now chief geologist, ROLAND D. IRVING is still active in the survey, and MOSES STRONG has passed away, dying in the midst of his duty. His report on the geology and topography of the lead region, occupying about 100 pages of the volume before us, bears witness to his ability and industry; and we do not hesitate to accept the eloquent memorial contained in the pamphlet Annual Report for 1877 as truth from the lips of friendship.

Part II. of the general report is Mr. CHAMBERLIN'S account of Eastern Wisconsin, composing its topography, hydrology, native vegetation, soils, quaternary formations and rocks. The latter are in this State archæan and palæozoic. The drift is peculiarly interesting in its nature and distribution, and has been studied by Messrs. CHAMBERLIN and IRVING in their respective fields with striking results, among which we may mention the determination of the "Kettle" range or ranges, extending more than a hundred miles, as a glacial moraine-formation.

Mr. IRVING'S discussion of the strange, sharply-defined, driftless area of Central Wiconsin, and its bearings on the geological history of the region, is very interesting. A discussion by Mr. CHAMBERLIN (p. 229) of the general movements which produced the quaternary formations of Wisconsin terminates with the consideration of the present encroachments of Lake Michigan upon the Wisconsin shore. In the neighborhood of Racine, where the advance is most rapid, it is about 3.33 feet per annum. It is merely erosion by the waves, acting upon high banks of clay, etc., and can be checked with suitable breakwaters.

Mr. IRVING'S account of Central Wisconsin follows a plan similar to that of the Chief Geologist, except as to order, the drift being considered last. His chapter on the general geological structure puts the subject in clear light, showing as well what points are yet unsettled as what may be considered well-determined. In his district, as in the eastern one, the drift overlies immediately the palæozoic rocks. In other words, the whole of Wisconsin was out of water from the close of the silurian until the time

of the glacial drift. The immense effect of subaerial erosion, during so long a period, more or less masked by the subsequent effects of the glaciers, furnishes an unusually attractive problem for geological analysis, difficult enough, we should say, to stimulate, but not to baffle, the energy and ingenuity of the student. Messrs. CHAMBERLIN and IRVING have worked it out in a very satisfactory way.

Mr. STRONG'S report on the lead region contains a brief description of its geology and topography, a condensed account of the mining industry in the different districts (including zinc as well as lead), highly valuable statistical tables, and some judicious remarks on drainage and exploration in the lower magnesian limestones. Some points vitally connected with the future of the lead-mining industry he reserved for a full discussion. Death having deprived us of his experience altogether, we can now only lament the reserve in the utterance of his opinions which, if he were yet living, we should approve.

The Annual Report of 1877 also postpones the discussion of the great question of the metalliferous character and the prospects of profitable mining in the lower magnesian limestones. We shall, however, probably not have to wait long for it, since Mr. CHAMBERLIN announces that he has completed the field work, and will complete the publication of the survey with all possible dispatch, in accordance with the will of the Legislature. We hope that the Legislature will change its "will"—not a very awful thing for a Legislature to do—and give the survey a new lease of life, if only to secure the study of such problems and the accurate record and preservation of such facts, as may be directly helpful to industry. An instrumental survey of the lead mines, one and all, for instance, would give archives of information, certain to be required by future explorers, and equally certain to be in a few years from now, quite inaccessible, if it is not collected now.

But if the survey is to be closed, we congratulate the young and active workers who conduct it upon the vigor and judgment they have displayed. We have left ourselves no room to speak of the labors of Mr. R. P. WHITFIELD in palæontology, or of Mr. CHAS. E. WRIGHT among the iron mines, and in the microscopic examination of rocks. These gentlemen will doubtless be more fully represented in the other volumes of the series, of which, we understand, there are to be three.

The atlas, containing fourteen maps, and the numerous illustrations in the text, are, like the mechanical typography, creditable to the Wisconsin printers and engravers. *

## ON THE USE OF RED CHARCOAL IN THE BLAST FURNACE.

By William Kent, M. E., of Pittsburg, Pa.

[Abstract of a paper read before the American Institute of Mining Engineers, at Philadelphia, Feb. 28, 1878.]

Referring to the paper read by Mr. FERNOW at the first session of the meeting on the "Economy of the Use of Red Charcoal," Mr. KENT quoted from PERCY on fuel to show that red charcoal had been used in the blast furnace as long ago as 1836. While the data furnished by early writers on the subject are not very complete, and are somewhat contradictory, they do not indicate that there has been any great economy effected by the use of red over black charcoal. PERCY states that in those cases where there had been an apparent advantage in the use of red charcoal, this advantage was proportionate to the degree of charring, or what is the same thing, to the approximation to black charcoal in composition and quality, and instead of heating the wood during four or five hours it was found necessary to continue the process during ten hours. He states further that in the course of its descent in the furnace, red charcoal is converted into black, but this can only be done at the expense of the heat contained in the gases ascending from the lower part of the furnace, and consequently the temperature of those gases will be proportionately reduced in the upper part of the furnace. Such reduction in temperature implies corresponding refrigeration, not only of the fuel, but also of the ore and flux, and may tend seriously to interfere with the process of smelting.

BELL, in his *Chemical Phenomena of Iron Smelting*, states that in the use of raw coal in the blast furnace the heat required to volatilize the gases of this raw coal has to be provided by burning so much more carbon at the tuyeres. A blast furnace using, he says, 22·5 cwt. of coke, ought, were its fuel used uncoked, to require 44 to 45 cwt. to do the work. This is confirmed by the practice of the furnaces in Scotland. It would seem clear that the consumption of coal required in the furnace itself is actually considerably higher when it is used raw than when coked, for 27 cwt. of coke obtained from coal containing 65 per cent. of fixed carbon, is only equal to 41·5 cwt. of coal—against 53 cwt. of the latter actually needful for the process.

The use of red charcoal or other imperfectly burned charcoal, in the blast furnace, is precisely analogous to the use of raw coal. The volatile hydrocarbons in each are of little or no value to reduce the ores, since they are volatilized in the upper part of the furnace; and since their volatilization can only be done at the expense of fixed carbon burned at the tuyeres, their use entails an actual loss of economy.

The great economy of fuel of the Lake Superior charcoal furnaces, where it is stated that imperfectly burned charcoal is sometimes used, is not necessarily due to the use of this kind of fuel. No analyses of the fuel of these furnaces have been furnished us from which to arrive at conclusions on the subject; but the writer believed that their fuel economy would be found, on closer investigation, to be due to other causes.

At the close of the foregoing paper a running discussion ensued, in which the author, Prof. PRIME, Mr. FERNOW, and others, took part, and the main result of which was the general admission that the subject was worthy of further inquiry, and could not be dismissed with a theoretical treatment only.

## THE CHICAGO PUMPING ENGINES.

By Theron Skeel, Engineer, New York.

The following paper is an analysis of the report of the performance of the west side pumping engines at Chicago, published in report of Board of Public Works for 1877. These engines were running for two months previous to January 1, 1878, the full record being published. Some experiments (the details of which are given in the appendix) were made in April by a board of experts. The full details of these experiments are not published in this report. The object of this paper is to prepare the results of these experiments so they may be compared with others previously made and with the performance of engines in practice.

In the report of the Engineer it is stated that the coal charged to the engine *includes* the coal used in *heating building*. This latter quantity must be a very inconsiderable portion. Generally the fire-rooms of pumping stations having boilers set in brick work are uncomfortably warm at all seasons, and the engine-rooms only need very little additional heat.

As an example of the relative amounts of coal burned in summer and in winter we have in same report statement of north side pumping engines, where coal used to heat building is charged in same way. (P. 29, Rep. Bd. Pub. Works, Chicago, 1876.)

*Coal consumed for pumping and heating building.*

| | | | |
|---|---|---|---|
| June | 2,640,560 | January | 2,564,990 |
| July | 2,924,400 | February | 2,579,020 |
| August | 2,972,160 | March | 2,808,620 |
| | 8,557,060 | | 7,952,630 |

*Gallons of water pumped.*

| | | | |
|---|---|---|---|
| June | 1,237,317,437 | January | 1,208,668,563 |
| July | 1,358,762,909 | February | 1,169,388,859 |
| August | 1,376,669,544 | March | 1,244,271,298 |
| | 3,972,749,890 | | 3,622,320,720 |

*Gallons of water pumped per pound of coal.*

| | | | |
|---|---|---|---|
| Summer | 464·3 | Winter | 454·0 |

Difference of economy 2½ per cent.

From these figures it appears that the economy in summer is only 2½ per cent. more than in winter, which difference would be accounted for by the amount of *heat lost through the chimney alone.* The coal used for heating therefore may be disregarded as insensibly small.

In the table on page 43 of same report the coal is divided into two parts.

1st. That used for pumping and heating building.

2d. Total coal used for all purposes—banking fires, experimenting with engines, etc.

NOTE.—The coal under second head is given in table as 14,000,000 lbs. It is presumed this is a misprint, as the same item is given on page 44 as 1,427,990 lbs.

This division of the coal into that supposed to have been used for "pumping only" and that used "for banking fires, etc.," is one of the most perplexing elements in the reports of pumping engines. I believe it has no value as a record of fact, being only an imaginary division by the fireman of the total coal into two portions, one of which he *supposes to have been burned while the engines were running* and a balance *supposed to have been burned while the engines were at rest.* The fireman may make a good guess or he may make a bad one, but in either case it is *only a guess.* As reports of pumping engines are published year by year this coal, "consumed for other purposes," becomes a relatively larger and larger amount until in this Chicago report the division is *absurd.*

Thus the coal used for pumping and heating buildings is given at 1,080,164 pounds and the engines were running $888\frac{5}{16}$ hours, leaving 1,320 — $888\frac{5}{16}$ = $431\frac{5}{16}$, during which the engines were at rest.

The coal burned while the engines were at rest is given at 1,426,199 — 1,080,164 = 346,035, being at the rate of 802 pounds per hour.

The engines were running $888\frac{5}{16}$ hours, out of which time both engines were running $471\frac{3}{16}$ hours *coupled*, making a total equivalent to $888\frac{5}{16}$ + $471\frac{3}{16}$ = $1,359\frac{8}{16}$ hours of a single engine. The coal was, therefore, burned at the rate of 787 pounds per hour, while the engines were running. According to these figures, then, it takes *less fuel to run one engine than to lie still.* It is evident that any division of the coal, which leads to such a result, is in error, and must be rejected.

Fortunately, during the last month the engines were run for 20 days, 23½ hours a day, during which time the coal burned is given. The figures given are:

| | | | |
|---|---|---|---|
| Duration (hours) | 471·3 | Head against pump | 113 feet. |
| Gallons of Water | 551,693,520 | Coal | 719,600 pounds. |

From these are deduced as follows:

| | | | |
|---|---|---|---|
| Duration | 471·3 | Coal per sq. ft. grate | 5·56 |
| Coal per hour | 1,526 | Coal per sq. ft. H. S. | 0·18 |
| | Duty, $71\frac{2}{16}$ millions. | | |

This would appear to be the commercial duty of these engines when running together for 23½ hours out of the 24. It will be observed that the boilers were not forced beyond that point at which one would expect the *highest economy;* that is to say, the boilers were large enough for this work.

The duty figured on the whole coal for the two months during which the engines were running is only about 52 millions.

The experiments made by the board of experts deserve in some respects particular commendation. They have resisted all temptation to make any allowances for imaginary resistances or for water not delivered by the pumps. It is hoped that their experiments in this respect will be taken as a precedent hereafter, and in all future experiments that the duty will be calculated on the actual pressure against which the pumps worked, and on the water actually delivered and not on the volume of water equivalent to the pump displacement, and on the pressure actually shown by the experiment and not on this pressure increased by any "allowance of 1½ pounds for each right angle bend in pipes," etc., as has heretofore been the case in too many important experiments.

It is to be regretted that the Board have not given more of the details of the experiment, particularly the method of determining the coal burned, the amount of ashes and refuse in the coal and the point in the main where the pressure pipe was attached.

The omission to give the ashes and the method of determining the coal burned makes the results entirely useless for comparison with other experiments as far as coal is concerned.

There were in use at the time of making the experiments (I believe) 180 sq. ft. of grate surface. If the coal were filled in on this grate a foot thick and burned out during the experiment, there would have been consumed $180 \times 50 = 9{,}000$ pounds of coal more than was weighed out; or conversely, if the fires were started thin and filled up toward the end of the experiment there would have been burned 9,000 pounds less than was weighed out. The duty in these two cases would have really been

1st case = 120 millions.
2d " = 78 "

while the figures shown by the records would have been 99 millions in each.

No experiment in which the amount of coal burned depends upon an estimate of the coal in the furnace at the commencement and the end of the experiment, especially when the coal in the furnace may amount to as large a proportion as 20 per cent., can be considered reliable.

It seems probable that the coal burned in this case was under-estimated from the high evaporation of the boilers.

No boilers of this type (horizontal tubular boilers set in brick work) have ever (so far as the knowledge of the writer extends) given a greater evaporation than 12 pounds of water per pound of combustible from 212°, corresponding to an evaporation of $9\frac{1}{10}$ pounds of water per pound of anthracite coal having $\frac{1}{6}$ ashes and refuse under the pressure and temperature of this experiment.

Of some twenty experiments made at the "Centennial" no boiler ever reached this figure.

The evaporation found by this experiment was $11\frac{15}{100}$ pounds of water per pound of coal from temperature of feed.

I am of the opinion, therefore, that either the coal had less than $\frac{1}{6}$ ashes and refuse or that the amount remaining in the furnace at the end was under-estimated, or both, and that the true commercial duty was less than that given in report in the proportion of 10 to $12\frac{1}{2}$, or twenty-five per cent., and that the real duty of these engines was about 75 millions. This view is corroborated by the actual duty shown by the engines during their 18 days' run in December, being 72 millions, which, increased by the $2\frac{1}{2}$ difference for summer and winter weather, would be 74 millions, or nearly a coincidence. THERON SKEEL.

APPENDIX.

*Dimensions of Engines.*—One pair of compound beam engines, without steam-jackets, each engine consisting of a low-pressure cylinder on the end of the beam, and a high-pressure cylinder between the low-pressure and the centre; the pump being a bucket and plunger pump, on the same rod as the low-pressure cylinder.

| | High. | Low. |
|---|---|---|
| Number of cylinders | 2 | 2 |
| Diameter (inches) | 48 | 76 |
| Pump stroke | 6 | 10 |
| Diameter of bucket (inches) | 51 | .. |
| " plunger " | 36 | .. |
| Stroke of plunger (feet) | 10 | .. |
| Number of pumps | 2 | .. |

*Boilers.*—Six horizontal tubular boilers set in brick-work, each boiler being 78 inches in diameter and 16 feet long, with 80 4-inch tubes.

| | Sq. ft. | Ratio. |
|---|---|---|
| Grate surface in each boiler | 45 | 1 |
| Heating " " | 1,416 | 32 |
| Cross area of tubes in each boiler | 7·64 | $\frac{1}{5\cdot9}$ |
| *Records of Experiment:* | | |
| Which Engine. | East. | West. |
| Duration of experiment in hours | 48 | 48 |
| *Hourly Quantities:* | | |
| Pounds of coal | 883 | 896 |
| " feed water | 9,779 | 10,059 |
| Revolutions | $670\frac{5}{10}$ | $637\frac{8}{10}$ |
| Cub. feet of water delivered | 90,014 | 86,738 |
| *Pressures:* | | |
| Steam | 61·77 | 60·86 |
| Vacuum | 12·83 | 12·77 |
| *Water Pressure against Pump:* | | |
| By gauge | 68·11 | 69·28 |
| By stand-pipe | 67·40 | 68·87 |
| *Temperature:* | | |
| Feed-water | 124° | 131° |
| Atmosphere | 46° | 61° |
| Boiler room | 77° | 73° |
| Engine room | 75° | 78° |
| *From one set of indicator cards:* | | |
| Revolution per minute when cards were taken | | 11·5 |
| *Pressure above Zero:* | High. | Low. |
| Initial | 72·0 | 23·0 |
| Cut off | 72·0 | ..... |
| Terminal | 34·7 | 8·0 |
| Mean back | 10·7 | 4·0 |
| Mean total | 55·7 | 11·2 |
| Mean indicated | 45·0 | 7·2 |
| Mean net | 45·0 | 5·2 |
| Point of cut off | 0·45 | . ... |
| Number of times steam is expanded | | $9\frac{1}{6}$ |
| Mean net pressure on high pressure piston reduced in ratio of stroke of high pressure to stroke of low pressure (pounds) | | 48,600 |
| Mean net pressure on low pressure (pounds) | | 23,400 |
| Twice the sum of the above divided by the area of the pump bucket, being the unbalanced pressure on pump bucket (pounds per sq. inch) | | 74·2 |
| Mean pressure in pump cylinder by card | | 76·2 |
| *Boilers:* | | |
| Number in use | 4 | 4 |
| Coal per sq. ft. of grate | 4·9 | 4·9 |
| " " " heating surface | $\frac{155}{1000}$ | $\frac{113}{1000}$ |
| " " " cross section | $29\frac{5}{10}$ | $29\frac{5}{10}$ |
| *Evaporation:* | | |
| Water per pound of coal from feed | 11·08 | 11·23 |
| " " " " 212° | 12·45 | 12·60 |
| *Power:* | | |
| Indicated horse power | 520 | |
| Total " " | 630 | |
| Net " " | 460 | |
| *Economic:* | | |
| Pounds of water per hour per Indicated horse power | 19·3 | |
| Total " | 15·9 | |
| Net " | 21·8 | |
| Pounds of coal per hour per Indicated horse power | 1·72 | |
| Total " | 1·42 | |
| Net " | 1·95 | |
| Mean pressure by indicator cards on pumps | | 76·2 |
| Mean pressure by gauge in main | | 69·3 |
| Loss of pressure by valves and passages | | 6·9 |
| *Duty:* | | |
| As given by board calculated on volume of water delivered on height of water in stand pipe, and on coal weighed out, mean of both experiments | | 99,000,000 |
| As estimated by writer of this report, calculated on same volume of water on pressure by *gauge*, and on the amount of coal, having 1-6 refuse that would have been burned if each pound of *combustible* had evaporated 12 pounds of water from 212° | | 75,000,000 |

## DR. HENRY MORTON AS AN EXPERT ON WATER-GAS.

During the recent controversy over his Harrisburg report, Dr. MORTON said: "My processes and results are no new thing with me, but have borne the test of long use in my hands as well as in those of others, and I have not the slightest doubt that every one of my results will be supported by every *honest* analysis which is made." When in his closing paragraph he promised to make "further analysis of water-gas wherever I find it, publishing the results, together with any other facts bearing on the question which may come within my knowledge," the writer felt the fullest confidence that the discussion would naturally re-open. And now, while busily engaged in distributing to the delighted citizens of Baltimore the new gas (of "objectionable constituents") at $2 per thousand for twenty candles, the last number of the *Gaslight Journal* (Feb. 16, 1878) informs me that the controversy is renewed. This time the parties engaged are President HENRY MORTON, at Harrisburg, and President HENRY MORTON, at New York, and this nice balance of ability will make the argument interesting. The former gentleman states that "the gas was allowed to flow through a glass tube immersed in a freezing mixture of ice and salt. In this tube there was collected a considerable amount of volatile liquid, *which proved, on examination, to be essentially benzine.*"

The latter gentleman reports that after similarly exposing the gas (in both cases water-gas enriched with petroleum hydrocarbons), there was deposited in the tube "a notable amount of volatile liquid," and, on making the analysis of this gas in the usual method, *we were surprised* to find no change in the proportion of the "olefines" or "illuminants" so called, as compared with the gas which had not been subjected to any refrigeration. This indicated that the liquid removed by the cooling treatment did *not* consist, as we had supposed beforehand, of *members of the aromatic series* or the like, but of paraffines or members of the marsh-gas series, which would not be absorbed by Nordhausen acid, or by bromine, and would not, therefore be reckoned as olefines. This, of course, raises the question as to whether it is possible to determine by the usual method of eudiometric analysis the composition of a mixture containing hydrogen, marsh-gas and one or more higher members of the marsh-gas or paraffine series. But an opposite assumption has been made the basis of a large amount of work, and has been accepted, unchallenged in some quarters." This last sentence is manifestly a sharp thrust at President MORTON at Harrisburg, the pleasure of inflicting which, it is hoped, will compensate a disappointment, for we are in good conscience compelled to deprive President MORTON at New York, of the slight comfort he may have expected to derive from his supposed discovery. At the time of our controversy with his Harrisburg namesake (December last), we held in our possession a report from Prof. HENRY WURTZ, dated November 3, 1877, upon the Lowe gas, in which, in commenting upon its composition, he says: "As I have often before stated to those interested in the Lowe process, *no reliable eudiometric method is as yet on record for separating from hydrogen and marsh-gas the higher homologues of the marsh-gas or paraffine series*, called, as above, *ethane* and *propane*. I am now engaged in devising and perfecting a method which will successfully overcome this difficulty." As an act of justice to Prof. WURTZ, we submit herewith his report in full.

If the President desires to attack the Harrisburg examination once more, we would respectfully suggest that after due investigation he make an official statement of the undoubted fact that carbonic oxide in burning consumes only one-fourth the oxygen required in burning marsh gas. And, to avoid any appearance of being partisan in a discussion to which we are not now a party, it is merely suggested to "the other gentleman" that he might retort by asking the MORTON of New York three straight questions, viz.:

*First*, Is he positive that the members of the paraffine series of gases are non-absorbable by bromine?

*Second*, Is he certain that they do not amount to more than five times the percentage stated in his last paper, viz., one per cent.?

*Third*, Did not the Harrisburg investigator find his figure for carbonic oxide (26·82) by assuming the full theoretic proportion of oxygen, without allowing for any diminution thereof by conversion to carbonic acid (afterward removed in the washing process), as well as for oxygen always absorbed by the iron pyrites present in the coal?

And here for the present we leave the "two" Doctors to settle their difference, expressing the hope that they will continue to study water-gas as a fruitful field of knowledge. Respectfully, G. S. DWIGHT.

THE YELLOW JACKET PUMPING ENGINE.—The engine to be used for pumping at the Yellow Jacket new shaft, just completed, is the largest ever manufactured on the Pacific Coast. Its cost is $300,000. It is a horizontal low pressure, compound condensing engine, and weighs the trifle of 1,200 tons. It is 1,500 horse-power, and the exterior dimensions are 64 feet in length and 18 feet in width. The initial cylinder is 32 inches in diameter, with a 12-foot stroke, and weighs 12 tons. The expansion cylinder is 65 inches in diameter, and weighs 30 tons. The shaft is 18 inches in diameter, and with the two tremendous cranks, weighs 30 tons. The two fly-wheels are each 30 feet in diameter and weigh 30 tons each. The main connecting rod is 54 feet long, and weighs 22 tons. The bed-plate is constructed in three lengths, for convenience in shipping. The boilers are of corresponding size.

## REPORT ON THE LOWE GAS PROCESS AT MANAYUNK.

By Henry Wurtz.

Being invited to make a second visit to Manayunk and determine the photometric value of the composition of the gas now being made there by the Lowe process, I have done so, and beg to report as follows:

A fine photometric apparatus was erected, which was obtained from Mr. W. W. GOODWIN, of Philadelphia, with clock-meter, by which the flow could be kept constantly at 5 cubic feet per hour. The candles used were also from Mr. GOODWIN. They were weighed delicately upon one of my own Becker balances, taken from my laboratory to Manayunk, and with a fine set of Becker's platinum chemical weights, whose accuracy has been verified by myself.

The photometric disc was a new one of my own making, with square spot, which disappeared absolutely.

On arriving at Manayunk, I found that for the *crude petroleum* (of specific gravity 0·8) used there for enrichment at the time of my former visit a year ago (as also at Utica during my investigation of two years ago at that place) there has now been substituted a *light naphtha*, of specific gravity 0·706.

Desiring to obtain results as nearly as possible comparable with those obtained at Utica, I directed that a somewhat larger proportion of this lighter enriching agent should be used. This was chiefly on account of the lower density of the naphtha, but also partly because the latter contains, weight for weight, about 1 per cent. less carbon than crude petroleum of average density.

The history of the gas tested and collected for analysis was as follows: The generation began at 3 P. M., Oct. 25, and ended at 3 P. M., Oct. 26. No gas from the coal-benches was being made into the large holder during this time. The total gas generated was 193,000 cubic feet (too large a make, probably, for the small purifiers to carry even under favorable circumstances). The amount of anthracite consumed was 9,843 lb., or 51 lb. per 2,000 feet of compound gas, or at the rate of 44,000 feet of illuminating gas per long ton (2,240 lb.) of anthracite.

The amount of naphtha of 70° Beaumé was 791 gallons, or 4·1 gallons per 1,000 cubic feet of compound gas; as against 3·15 gallons of crude petroleum of 46° Beaumé, used in Utica during my examinations in October, 1875.

This gas was found, as on my previous visit to Manayunk in October, 1876, to be imperfectly purified, staining lead-paper and precipitating lime-water. This is due to inadequate tray-surface in the purifying boxes to withstand the violent though transient rush of gas from the generators during the rapid stages of its evolution, which causes perforations through the layers of lime, rendering them inefficient for further work.

In my report made of this previous visit, addressed to Mr. THOMAS R. BROWN, Chief Engineer of the Gas Trust, an improvement in the process was proposed by introducing between the condensers and the purifiers a small holder to act as a governor. This has not yet been carried out.

The photometric tests were made upon the gas in the large holder on the 26th of October, between the hours of 12 M. and 3:15 P. M. They were two in number and continued during one hour each, the disc being observed at three-minute intervals or twenty observations during each hour. The mean of all the observations was equal to 20·006 candles burning at the rate of 120 grains of sperm per hour. Had the gas been freed by complete purification from the 2 per cent. of carbonic acid which it still retained, as shown by the analysis below, its candle-power would have been at least 10 per cent. higher, or 22 candles.

It should be added that the burner used was well adapted to the gas, being a 19 candle, 27 hole Sugg Argand, selected by Mr. GOODWIN. The pressure required at this burner to pass 5 cubic feet per hour, was nine-tenths of an inch of water. With inferior burners doubtless a somewhat lower candle power might be arrived at.

The samples of gas for analysis were collected by displacement during the same hours occupied in the photometric tests, in three glass-stoppered bottles, selected with care for the perfectly hermetical fit of their stoppers.

Each bottle was inverted, a glass tube introduced to the upper interior, a rapid flow of gas kept up for one hour, and the bottle then lowered till its lips dipped into a bowl of thick concentrated glycerine. When the gas had bubbled through this for a further period, the glass tube was removed and the glass stopper inserted under the glycerine. These bottles were then brought to my private laboratory in Hoboken, their contents transferred to calibrated eudiometers over mercury, and the ordinary methods of absorptiometry applied, exactly as prescribed in *Bunsen's Gasometry* (ROSCOE'S edition of 1857), *so far as these methods are applicable to gaseous mixtures of this class.* For the absorption of sulphureted hydrogen, however, a solution of zinc-sulphate is used by me. The re-agents employed were all chemically pure and of the highest efficiency in their action.

The results of this analysis were as follows:

| | | |
|---|---|---|
| Sulphureted Hydrogen—Impurity | | ·44 |
| Carbonic acid—Impurity | | 2·29 |
| Oxygen | | ·20 |
| Carbonic oxide, absorbed by acid Cu Cl 19·92 and 20·16 mean | | 20·04 |
| Olefiant gas and its homologues (with benzole vapor?) absorbed by anhydrous S $O^3$ | | 7·99 |
| *Hydrogen:* with the | | |
| Gaseous .... Marsh gas or | *Methane* C $H^4$ | 69·04 |
| Paraffine .... *Ethane* $C^2$ $H^6$ | | |
| Homologues *Propane* $C^3$ $H^8$ | | |
| | | 100·00 |

As I have often stated before to those interested in the Lowe process no reliable eudiometric method is as yet on record for separating from hydrogen and marsh gas the higher homologues of the marsh or paraffine series, called as above (by HOFFMAN'S nomenclature), *Ethane* and *Propane.*

I am now engaged in devising and perfecting methods which will successfully overcome this difficulty, when analysys will be presented, more complete than the above. This is the more important, inasmuch as these gases, ethane and propane, are among the illuminant constituents of gas made of or enriched with petroleum and naphtha. Their accurate determination is therefore essential to the understanding and correct valuation by analysis of gases of this class.

All of which is respectfully submitted.

HENRY WURTZ.

No. 12 Hudson Terrace, Hoboken, November 3, 1877.

## THE BLUE PROCESS OF COPYING TRACINGS.

By P. Barnes.

[A paper read before the American Institute of Mining Engineers, at Philadelphia, Feb. 26, 1878.]

It may be of interest, and perhaps of importance, to the members of the Institute that specific mention should be made in detail of the great value of this method of copying or photographing all kinds of tracings.

Several samples are laid upon the table which may serve as illustrations of the results obtained. Some of these show slight imperfections, depending upon the character of the tracing and upon the length of the exposure to the light, but it may be clearly seen that even a faint copy would be quite available for actual use.

The process is believed to be of French origin, and has been used for many years. Special attention seems to have been directed to it recently, and its great value to engineers appears likely to be fully recognized.

The manipulations required are of the simplest possible kind and are entirely within the skill and comprehension of any office boy who can be trusted to copy a letter in an ordinary press.

These particulars may be summarized somewhat thus:

1. Provide a flat board as large as the tracing which is to be copied.
2. Lay on this board two or three thicknesses of common blanket or its equivalent, to give a slightly-yielding backing for the paper.
3. Lay on the blanket the prepared paper with the sensitive side uppermost.
4. Lay on this paper the tracing, smoothing it out as perfectly as possible, so as to ensure a perfect contact with the paper.
5. Lay on the tracing a plate of clear glass, which should be heavy enough to press the tracing close down upon the paper. Ordinary plate glass of ⅜″ thickness is quite sufficient.
6. Expose the whole to a clear sunlight, by pushing it out on a shelf from an ordinary window, or in any other convenient way, for 6 to 10 minutes. If a clear sky-light only can be had, the exposure must be continued for 30 to 45 minutes, and under a cloudy sky 60 to 90 may be needed.
7. Remove the prepared paper and wash it freely for one or two minutes in clean water, and hang it up by one corner to dry.

Any good hard paper may be employed (from even a leaf from a press copy book up to Bristol board), which will bear the necessary wetting.

For the sensitizing solution take 1⅞ oz. citrate of iron and ammonia; 8 oz. clean water; and also 1¼ oz. red prussiate of potash; 8 oz. clean water; dissolve these separately and mix them, keeping the solution in a yellow glass bottle, or carefully protected from the light.

The paper may be very conveniently coated with a sponge of 4″ diam., with one flat side.

The paper may be gone over once with the sponge quite moist with the solution and a second time with the sponge squeezed very dry.

The sheet should then be laid away to dry in a dark place, as in a drawer, and must be shielded from the light until it is to be used.

When dry, the paper is of a full yellow and bronze color. After the exposure to the light the surface becomes a darker bronze and the lines of the tracings appear as still darker on the surface.

Upon washing the paper the characteristic blue tint appears with the lines of the tracing in vivid contrast.

It will readily be seen that the process is strictly photographic in the ordinary sense of the word, the tracing taking the place in the printing of the ordinary glass negative.

A working drawing thus made furnishes its own background, and does not require to be placed over a white background, as is often the case with a tracing. If desired, the copy can be made upon common bond paper, which can be mounted upon a board in the usual way.

Inasmuch as such copies can be made from tracings only, it may be well to suggest and urge that drawings can be completed or nearly so in pencil upon paper in the usual way, and that all the inking can be done upon tracing cloth laid upon the pencil work. In this way the cost of the tracing (in the ordinary sense) can be wholly saved, and the single copy of the finished tracing can thus be made in the "blue" way to the best possible advantage.

It may safely be said that this method of copying can be employed, if only one or two copies per week are needed, of ordinarily complex drawings, with excellent results, and with a very important saving of time and money.

Mr. HOLLEY confirmed the statements of Mr. BARNES as to the great convenience of this process.

Mr. ROBERT HUNT, of Troy, said there was no difficulty in using in the shop working drawings so prepared.

After further remarks by Dr. HUNT and Mr. BIRKENBINE, the session was adjourned.

## NOTES.

THE total make of pig in Belgium in the year 1877 was 425,200 tons.

THE BLUE HILL (MAINE) COPPER MINING COMPANY has contracted with smelters in Boston to furnish 100 tons of ore per month at the rate of $2 per unit for all ore running higher than 5 per cent.

THE WELSH COAL AND IRON TRADES.—The shipments of iron, coal and coke from Cardiff, Wales, during the month of January were considerably larger than for the same month in 1877; yet, owing to the excessive productive capacity trade is very much depressed.

A LARGE CARGO OF COAL FROM RICHMOND.—The schooner Dreadnaught sailed from Richmond, Va., on the 27th ult., laden with 733 tons Cannelton Cannel for New York, being the largest cargo of coal ever shipped from Richmond. She was loaded by the Cannelton Coal Co. in 24 hours.

THE NEW RAILROAD IN THE CUMBERLAND COAL REGION.—The Cumberland *News* of the 6th inst. says: "The Maryland Coal Company is employing a number of laborers on the narrow-gauge railroad which is to run from Lonaconing to Cumberland. To-day the American Coal Company will start to work on their side of the mountain, in accordance with a contract with the Baltimore & Ohio Railroad and the Chesapeake & Ohio Canal Company."

PLIOCENE MAN.—At the meeting of the American Philosophical Society, January 18, Professor Cope announced the receipt of a collection of fossils from a Pliocene lake-bed in Oregon. In the deposits, in undistinguishable relation with known pliocene fossils, were found numerous flakes, with arrow and spear heads, of obsidian, many of them much tarnished by long erosion. All were lying mingled together on the surface of a bed of clay, which was covered by a deposit of "volcanic sand and ashes" of from fifteen to twenty feet in depth. This had been drifted away by the wind in some localities, thus exposing the remains.—*Frank. Inst. Journal.*

## A DECIMAL GAUGE FOR SHEET METAL AND WIRE.

By Robt. Briggs, C. E.

(*Continued from page* 148.)

[Abstract of a paper published in the Journal of the Franklin Institute, December, 1867.]

It remains to be shown what advantages are to be derived from the adoption of this gauge. It will give a scale of proportionate dimensions for all the practical sizes of thickness of sheet metal and diameter of wire; which scale can be extended upwards or downwards to cover any possible future demand. The American gauge already does this, so far as uniform proportion is concerned, equally well. But the decimal gauge gives a numerical proportion which is easily remembered and readily used in computation. In sheet metal especially, it is the constant requirement upon the workman to estimate for weights. Having calculated with much care the weight of a vessel or tank, a boiler or cauldron, for some assumed thickness, it would be a great boon to him to be able at once to increase or reduce the weight of the same to suit conditions, without resorting to a new set of figures. If such a thing is to weigh 10 per cent. less than it "comes out," then a gauge off from the thickness of the plates will surely accomplish the reduction. If a purchaser desires an article of sheet iron to be of a certain gauge, when its weight of another gauge is known, the transformation becomes easy. For the transformation of weights of wire of given lengths, but varying gauges, the same simple reduction of tenth, or increase of ninth parts follows; only there are two *successive* reductions or increases to be made for each number in place of one, as the areas of sections of wire vary as the squares and not as the diameters, and we take $(\frac{9}{10})^2$, as the difference of each step of weight of wire.

It must not be supposed that any system will divest the computer in metal work from the use of tables and long lines of decimals. The relation of weights of various metals to their volume is not to be expressed in units. A cubic decimeter of water weighs 1 kilogramme, but a cubic decimeter of iron weighs, sometimes, 7·7694 kilogrammes. No system can simplify this relationship. An inch thick of iron 1 foot square weighs 40·4167 lbs. Were this simplified by making a special pound weight to 40 lbs., even then a plate of iron, $\frac{13}{64}$ in thickness, has not a very convenient arrangement of decimals for its weight per square foot. Expressing thickness in any order of figures that may be taken, will not eliminate the long rows of tabular values which must follow the incompatible data needed in practice. But if the proportions of thickness and

### TABLE II.

WEIGHT OF ONE SQUARE FOOT OF SHEET METAL, OR ONE FOOT IN LENGTH OF WIRE, OF THICKNESSES OR DIAMETERS GIVEN BY THE DECIMAL GAUGE; ENGLISH UNITS.

| No. of Gauge. | Thickness or Diameter. | One square foot of sheet metal. | | | | One foot in length of wire. | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Iron, pounds. | Steel, pounds. | Copper, pounds. | Brass, pounds. | Iron, pounds. | Steel, pounds. | Copper, pounds. | Brass, pounds. |
| — 3 | 0·5401 | 21·8277 | 22·0460 | 24 4650 | 23·1148 | 0·76359 | 0·77926 | 0·88290 | 0·85052 |
| — 2 | 0·4861 | 19·6449 | 19·8413 | 22·0185 | 20·8033 | 0·61851 | 0·63120 | 0·71515 | 0·68892 |
| — 1 | 0·4375 | 17·6804 | 17·8572 | 19·8167 | 18·7230 | 0·50099 | 0·51127 | 0·57927 | 0·55803 |
| 0 | 0·3937 | 15·9124 | 16·0715 | 17·8350 | 16·8507 | 0·40580 | 0·41413 | 0·46921 | 0·44300 |
| 1 | 0·3543 | 14·3211 | 14·4643 | 16·0515 | 15·1656 | 0·32870 | 0·33545 | 0·38006 | 0·35883 |
| 2 | 0·3189 | 12·8890 | 13·0178 | 14·4463 | 13·6490 | 0·26624 | 0·27171 | 0·30785 | 0·29066 |
| 3 | 0·2870 | 11·6001 | 11·7161 | 13·0017 | 12·2841 | 0·21566 | 0·22009 | 0·24936 | 0·23543 |
| 4 | 0·2583 | 10·4401 | 10·5445 | 11·7015 | 11·0557 | 0·17468 | 0·17827 | 0·20198 | 0·19070 |
| 5 | 0·2324 | 9·3961 | 9·4901 | 10·5313 | 9·9501 | 0·14150 | 0·14440 | 0·16360 | 0·15446 |
| 6 | 0·2092 | 8·4565 | 8·5411 | 9·4782 | 8·9551 | 0·11461 | 0·11696 | 0·13252 | 0·12512 |
| 7 | 0·1883 | 7·6108 | 7·6869 | 8·5304 | 8·0596 | 0·09283 | 0·09474 | 0·10734 | 0·10134 |
| 8 | 0·1695 | 6·8498 | 6·9182 | 7·6774 | 7·2536 | 0·07520 | 0·07674 | 0·08695 | 0·08209 |
| 9 | 0·1525 | 6·1648 | 6·2264 | 6·9096 | 6·5283 | 0·06091 | 0·06216 | 0·07043 | 0·06649 |
| 10 | 0·1373 | 5·5483 | 5·6037 | 6·2187 | 5·8755 | 0·04934 | 0·05035 | 0·05705 | 0·05386 |
| 11 | 0·1236 | 4·9935 | 5·0434 | 5·5967 | 5·2879 | 0·03996 | 0·04078 | 0·04621 | 0·04363 |
| 12 | 0·1112 | 4·4941 | 4·5400 | 5·0371 | 4·7591 | 0·03237 | 0·03303 | 0·03743 | 0·03534 |
| 13 | 0·10008 | 4·0447 | 4·0851 | 4·5334 | 4·2832 | 0·02622 | 0·02676 | 0·03032 | 0·02862 |
| 14 | 0·09007 | 3·6402 | 3·6760 | 4·0801 | 3·8549 | 0·02124 | 0·02167 | 0·02456 | 0·02318 |
| 15 | 0·08106 | 3·2762 | 3·3090 | 3·6721 | 3·4694 | 0·01720 | 0·01756 | 0·01989 | 0·01878 |
| 16 | 0·07296 | 2·9486 | 2·9781 | 3·3048 | 3·1225 | 0·01393 | 0·01422 | 0·01611 | 0·01521 |
| 17 | 0·06566 | 2·6537 | 2·6822 | 2·9744 | 2·8102 | 0·01129 | 0·01152 | 0·01305 | 0·01232 |
| 18 | 0·05909 | 2·3884 | 2·4123 | 2·6769 | 2·5292 | 0·009142 | 0·009330 | 0·01057 | 0·009980 |
| 19 | 0·05318 | 2·1495 | 2·1710 | 2·4092 | 2·2763 | 0·007405 | 0·007557 | 0·008562 | 0·008084 |
| 20 | 0·04787 | 1·9346 | 1·9539 | 2·1683 | 2·0487 | 0·005998 | 0·006121 | 0·006935 | 0·006548 |
| 21 | 0·04307 | 1·7411 | 1·7585 | 1·9515 | 1·8438 | 0·004858 | 0·004958 | 0·005618 | 0·005304 |
| 22 | 0·03877 | 1·5670 | 1·5827 | 1·7563 | 1·6594 | 0 003935 | 0·004016 | 0·004550 | 0·004296 |
| 23 | 0·03489 | 1·4103 | 1·4244 | 1·5807 | 1·4935 | 0·003188 | 0·003253 | 0·003686 | 0·003480 |
| 24 | 0·03140 | 1·2693 | 1·2820 | 1·4226 | 1·3441 | 0·002582 | 0·002635 | 0·002985 | 0·002819 |
| 25 | 0·02864 | 1·1423 | 1·1537 | 1·2804 | 1·2097 | 0·002091 | 0·002134 | 0·002418 | 0·002283 |
| 26 | 0·02544 | 1·0281 | 1·0384 | 1·1523 | 1·0887 | 0·001694 | 0·001729 | 0·001959 | 0·001849 |
| 27 | 0·02289 | 0·9253 | 0·9346 | 1·0371 | 0·9799 | 0·001372 | 0·001400 | 0·001587 | 0·001498 |
| 28 | 0·02060 | 0·8328 | 0·8411 | 0·9334 | 0·8819 | 0·001111 | 0·001134 | 0·001295 | 0·001213 |
| 29 | 0·01854 | 0·7495 | 0·7570 | 0·8401 | 0·7937 | 0·0009003 | 0·0009188 | 0·001041 | 0·0009828 |
| 30 | 0·01669 | 0·6745 | 0·6812 | 0·7560 | 0·7143 | 0·0007292 | 0·0007442 | 0·0008432 | 0·0007961 |
| 31 | 0·01502 | 0·6071 | 0·6132 | 0·6804 | 0·6429 | 0·0005907 | 0·0006028 | 0·0006830 | 0·0006448 |
| 32 | 0·01351 | 0·5464 | 0·5519 | 0·6124 | 0·5786 | 0·0004785 | 0·0004883 | 0·0005532 | 0·0005223 |
| 33 | 0·01217 | 0·4917 | 0·4966 | 0·5512 | 0·5207 | 0·0003876 | 0·0003955 | 0·0004481 | 0·0004231 |
| 34 | 0·01095 | 0·4426 | 0·4470 | 0·4960 | 0·4687 | 0·0003139 | 0·0003204 | 0·0003630 | 0·0003427 |
| 35 | 0·009856 | 0·3983 | 0·4023 | 0·4464 | 0·4218 | 0·0C02543 | 0·0002595 | 0·0002940 | 0·0002776 |
| 36 | 0·008870 | 0·3585 | 0·3621 | 0·4018 | 0·3796 | 0·0002060 | 0·0002102 | 0·0002381 | 0·0002248 |
| 37 | 0·007983 | 0·3226 | 0·3258 | 0·3616 | 0·3417 | 0·0001668 | 0·0001702 | 0·0001929 | 0·0001821 |
| 38 | 0·007185 | 0·2904 | 0·2933 | 0·3255 | 0·3075 | 0·0001351 | 0·0001379 | 0·0001562 | 0·0001475 |
| 39 | 0·006466 | 0·2613 | 0·2639 | 0·2929 | 0·2767 | 0·0001095 | 0·0001117 | 0·0001266 | 0·0001195 |
| 40 | 0·005819 | 0·2352 | 0·2376 | 0·2636 | 0·2491 | 0·0000866 | 0·0000948 | 0·0001025 | 0·00009678 |
| Specific Gravity. | | 7·769 | 7·847 | 8·708 | 8·228 | 7·6893 | 7·847 | 8·891 | 8·394 |
| Weight per cu. ft.[1] | | 485 | 489·85 | 543·6 | 513·6 | 480 | 489·85 | 555 | 524 |
| Weight per cu. in. | | 0·28067 | 0·28348 | 0·3146 | 0·2972 | 0·2807 | 0·2836 | 0·3212 | 0·3033 |
| Weight 1 ft. long, 1 in. round. | | 2·6453 | 2·6717 | 2·95 | 2·8012 | 2·6180 | 2·6717 | 3·0283 | 2·8589 |

[1] These figures for weight per cubic foot were adopted from Trautwine.

### TABLE III.

WEIGHT OF ONE SQUARE METER OF SHEET METAL, OR ONE METER IN LENGTH OF WIRE, OF THICKNESSES OR DIAMETERS GIVEN BY THE DECIMAL GAUGE; METRIC UNITS.

| No. of Gauge. | Thickness or Diameter, Centimeters. | One square metre of sheet metal. | | | | One metre in length of round wire. | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Iron, kilos. | Steel, kilos. | Copper, kilos. | Brass, kilos. | Iron, kilos. | Steel, kilos. | Copper, kilos. | Brass, kilos. |
| — 3 | 1·3717 | 106·576 | 107·643 | 119·453 | 112·860 | 1·13637 | 1·04373 | 1·31391 | 1·24054 |
| — 2 | 1·2346 | 95·9185 | 96·8777 | 107·508 | 101·574 | 0·92046 | 0·93935 | 1 06427 | 1·00484 |
| — 1 | 1·1111 | 86·3207 | 87·1900 | 96·7568 | 91·4170 | 0·74557 | 0·76088 | 0·86206 | 0·81392 |
| 0 | 1· | 77·6940 | 78·4707 | 87·0811 | 82·2753 | 0·60391 | 0·61631 | 0·69827 | 0·65928 |
| 1 | 0·9 | 69·9246 | 70·6238 | 78·3730 | 74·0478 | 0·48917 | 0·49921 | 0·56560 | 0·53401 |
| 2 | 0·81 | 62·9321 | 63·5614 | 70·5357 | 66·6430 | 0·39623 | 0·40436 | 0·45813 | 0·43255 |
| 3 | 0·729 | 56·6389 | 57·2053 | 63·4821 | 59·9787 | 0·32094 | 0·32753 | 0·37109 | 0·35037 |
| 4 | 0·6561 | 50·9750 | 51·4847 | 57·1339 | 53·9808 | 0·25997 | 0·26530 | 0·30038 | 0·28380 |
| 5 | 0·5905 | 45·8775 | 46·3362 | 51·4205 | 48·5827 | 0·21057 | 0·21489 | 0·24347 | 0·22988 |
| 6 | 0·5314 | 41·2898 | 41·7027 | 46·2784 | 43·7244 | 0·17056 | 0·17406 | 0 19721 | 0·18620 |
| 7 | 0·4783 | 37·1618 | 37·5334 | 41·6506 | 39·3520 | 0·13816 | 0·14099 | 0·15974 | 0·15082 |
| 8 | 0·4305 | 33·4447 | 34·7891 | 37·4855 | 35·4168 | 0·11191 | 0·11420 | 0·12939 | 0·12216 |
| 9 | 0·3874 | 30·1002 | 30·4012 | 33·7370 | 31·8751 | 0·090644 | 0·092504 | 0·10481 | 0·098953 |
| 10 | 0·3487 | 27·0901 | 27·3610 | 30·3633 | 28·6876 | 0·073422 | 0·074929 | 0·084894 | 0·080152 |
| 11 | 0·3138 | 24·3810 | 24·6248 | 27·3270 | 25·8188 | 0·059472 | 0·060692 | 0·068764 | 0·064923 |
| 12 | 0·2824 | 21·9429 | 22·1623 | 24·5943 | 23·2369 | 0·048172 | 0·049161 | 0·055699 | 0·052588 |
| 13 | 0·2542 | 19·7486 | 19·9461 | 22·1349 | 20·9132 | 0·039019 | 0·039820 | 0·045116 | 0·042596 |
| 14 | 0·2288 | 17·7737 | 17·9514 | 19·9214 | 18·8219 | 0·031606 | 0·032254 | 0·036544 | 0·034503 |
| 15 | 0·2059 | 15·9963 | 16·1563 | 17·9293 | 16·9397 | 0·025601 | 0·026126 | 0·029601 | 0·027947 |
| 16 | 0·1853 | 14·3967 | 14·5407 | 16·1364 | 15·2457 | 0·020736 | 0·021162 | 0·023977 | 0·022637 |
| 17 | 0·1668 | 12·9570 | 13·0866 | 14·5228 | 13·7211 | 0·016797 | 0·017141 | 0·019421 | 0·018336 |
| 18 | 0·1560 | 11·6613 | 11·7779 | 13·0705 | 12·3490 | 0·013605 | 0·013885 | 0·015731 | 0·014852 |
| 19 | 0·1351 | 10·4952 | 10·6002 | 11·7634 | 11·1141 | 0·011020 | 0·011246 | 0·012742 | 0·012031 |
| 20 | 0·1216 | 9·4457 | 9·5402 | 10·5871 | 10·0026 | 0·008926 | 0·009110 | 0·010321 | 0·009745 |
| 21 | 0·1094 | 8·5011 | 8·5861 | 9·5284 | 9·0022 | 0·007230 | 0·007374 | 0·008360 | 0·007893 |
| 22 | 0·09848 | 7·6510 | 7·7277 | 8·5756 | 8·1020 | 0·005857 | 0·006772 | 0·006393 | |
| 23 | 0·08863 | 6·8859 | 6·7548 | 7·7180 | 7·2918 | 0·004744 | 0·005379 | 0·005485 | 0·005179 |
| 24 | 0·07977 | 6·1973 | 6·2593 | 6·9462 | 6·5626 | 0·003843 | 0·004841 | 0·004443 | 0·004195 |
| 25 | 0·07179 | 5·5776 | 5·6336 | 6·2516 | 5·9064 | 0·003112 | 0·003176 | 0·003599 | 0·003398 |
| 26 | 0·06461 | 5·0199 | 5·0700 | 5·6264 | 5·3157 | 0·002521 | 0·002573 | 0·002915 | 0·002752 |
| 27 | 0·05815 | 4·5179 | 4·5631 | 5·0638 | 4·7842 | 0·002042 | 0·002084 | 0·002361 | 0·002229 |
| 28 | 0·05233 | 4·0661 | 4·1068 | 4·5574 | 4·3058 | 0·001654 | 0·001688 | 0·001912 | 0·001806 |
| 29 | 0·04710 | 3·6595 | 3·6961 | 4·1017 | 3·8752 | 0·001340 | 0·001367 | 0·001549 | 0·001463 |
| 30 | 0·04239 | 3·2936 | 3·3265 | 3·6915 | 3·4877 | 0·001085 | 0·0011075 | 0·001255 | 0·00185 |
| 31 | 0·03815 | 2·9642 | 2·9938 | 3·3223 | 3·1389 | 0·0008790 | 0·0008971 | 0·0010164 | 0·0009506 |
| 32 | 0·03434 | 2·6678 | 2·6945 | 2·9901 | 2·8251 | 0·0007120 | 0·0007266 | 0·0008233 | 0·0007773 |
| 33 | 0·03090 | 2·4010 | 2·4250 | 2·6011 | 2·5425 | 0·0005767 | 0·0005886 | 0·0006669 | 0·0006296 |
| 34 | 0·02781 | 2·1609 | 2·1825 | 2·4220 | 2·2883 | 0·0004204 | 0·0004767 | 0·0005402 | 0·0005100 |
| 35 | 0·02503 | 1·9448 | 1·9642 | 2·1798 | 2·0595 | 0·0003784 | 0·0003862 | 0·0004375 | 0·0004131 |
| 36 | 0·02253 | 1·7504 | 1·7679 | 1·9618 | 1·8535 | 0·0003065 | 0·0003126 | 0·0003544 | 0·0003346 |
| 37 | 0·02028 | 1·5753 | 1·5911 | 1·7656 | 1·6682 | 0 0002483 | 0·0002534 | 0·0002871 | 0·0002710 |
| 38 | 0·01825 | 1·4178 | 1·4320 | 1·5891 | 1·5013 | 0·0002011 | 0·0002052 | 0·0002325 | 0·0002195 |
| 39 | 0·01642 | 1·2760 | 1·4302 | 1·4302 | 1·3512 | 0·0001629 | 0·0001662 | 0·0001883 | 0·0001778 |
| 40 | 0·01478 | 1·1484 | 1·1599 | 1·2871 | 1·2161 | 0·0001319 | 0·0001346 | 0·0001526 | 0·0001440 |
| Specific Gravity. | | 7·769 | 7·847 | 8·708 | 8·2281 | 7·6893 | 7·847 | 8·891 | 8·3941 |

[1] Value of specific gravity of brass sheets or wire dependent on the composition of brass.

diameter of commercial and usual sheets and wire are made uniform in the first place, and then have simply related values, such values can be used in computation of the tables, and the relative proportions can be applied to results obtained from the tables.

One more advantage may follow the introduction of a decimal gauge as here described. There exists an absolute necessity for such a gauge, with its exponential in place of arithmetic notation. That such a gauge can be made to become uniform in all nations, the adjustment of the unit to the metric system may offer some inducement to other countries, The Birmingham unit of 0·34 of an inch is purely arbitrary, and out of agreement with any unit of measurement, English or foreign, while the proposed unit of a centimeter = 0·3937 of an inch, gives a standard which is admitted in all lands. If this decimal gauge can be made a universal measure for sheet metal all over the world, it will then have accomplished an end second only in importance to its practical application to the wants of the workmen of England and America.

NOTE.—The foregoing paper appears at this time as the result of an inquiry by Prof. Hilgard, of the U. S. Coast Survey, from the writer about two months since: "What do you know about wire gauges?" The answer then given was that I had examined the subject quite fully many years, 20 or more, since, and had reached conclusions satisfactory to myself, at least, among which were: that they were a necessity to the sheet metal or wire maker, dealer or worker; that the thicknesses indicated by the numbers should vary proportionately by a common ratio, and not arithmetically by constant difference; that the value of the common ratio should be a simple one, etc., etc. After setting forth the scheme, and preparing an illustration of it graphically, as shown on the plate, its publication, as a matter of public interest, was advised by Prof. Hilgard. While going to press, I have been favored by the Professor with a copy of a communication addressed to him on October 26, from the Department of Standards, Board of Trade, England, asking if there is any official gauge or standard measure in the United States for wire and sheet metals, and whether more than one gauge is used by manufacturers in America; and saying that in the German Empire there is some agitation for the establishment of a better gauge than the Birmingham or Dilhingen gauges now in use, and adverting to the *unsatisfactory* Birmingham gauge now in use in England. From all this it would appear that the present time is auspicious for the consideration of the subject of the paper in this and other countries.

NOTE.—The two systems of gauges, denominated Decimal and American, have a common dimension at 18·1162 when the thickness is 2·6546 inches, and the American gauge is half as thick as the Decimal one at + 47·2143, when the American gauge becomes = 0·0013 inches and the Decimal gauge = 0·002724 inches.

## A HISTORY OF TUNNELING.

*Continued from page* 149.

[Extracts from advance proofs of *A Treatise on Tunneling, Explosive Compounds and Rock Drills*, by Henry S. Drinker, Mining and Civil Engineer. Published by John Wiley & Sons, New York. (Copyrighted.)]

In 1308, guns are spoken of before Gibraltar; 1311, muskets before Brescia; and in 1312, guns were used by the Arabs before Baza. In the Amberg Arsenal, there is said to be a gun bearing the date 1303. From this time on, statements grow more frequent and reliable on the subject, and we come to the period before considered, in which Berthold Schwartz seems to have applied or invented the substance approximating in nature to our modern gunpowder. Though the data given admit of discussion as to whether the "guns" used before the Moorish wars were truly guns in our sense of the word, or perhaps only a name for the fiery balls hurled by the old slinging machines, there seems to be no doubt that a mixture containing a large percentage of saltpetre was known at the time of the Byzantines, and that our gunpowder came from the East to Europe. It is certain that, in the beginning of the fourteenth century, the existence of such a mixture was widely known in Germany on account of the terrible properties with which it was accredited; and it would seem a fair assumption to make, that the matter struck one of the learned monks who at that time alone followed scientific pursuits; that, on investigation, he finally prepared and made known an explosive compound of a more perfect kind than any of the former compounds. This opinion would seem to be strengthened by the circumstance that the old manuscripts preserved in the monasteries directly claimed that "Barthel" knew of Roger Bacon's works,‖ and the opinion is further backed by the many concurrent sources tending to fix Germany as the locality from which the discovery emanated.

That "Barthel's" invention, if it be accepted as his at all, must at least be placed at 1320, would seem confirmed by other occurrences from 1334 to 1344, from which we see in general, that Germany advanced steadily in the preparation of powder and of guns; and as, at that time, German mercenaries served in the Italian wars, the introduction of guns from Germany to Italy, for instance, perhaps at Chioza, in 1379, is the more easily explained, as at that time the "Hansa" (Hanseatic League) flourished.

In the beginning powder was prepared by hand; later on, mills were introduced. The first true powder-mill in Germany, as has already been noted, is said to have been in operation at Augsburg in 1340, and in 1360, the manufacture of powder must certainly have been going on, for, as we have also seen, the burning down of the Lübeck Rathhaus (City Hall) was attributed to it.

Later, stamp mills were introduced in place of the early mill-stones, between which the powder had been ground, the latter being found too dangerous. One Harscher owned a stamp-mill near Nuremberg, in 1435; and in the latter half of the fifteenth century these mills were built in almost all European countries.

In the year 1692, we are told that there were 22 powder-mills with 829 stamps in France alone. The first Silesian powder-mill was built by Pollak in 1536. The first rotary mill is said to have been built in 1754 by Ferri, at Essone, in France, and, in the same year, Karl Knutberg, in Sweden, describes a similar arrangement—*i. e.*, rotation of wooden wheels around a vertical axis. In 1756, Ferri made a new arrangement, rejected again however, in which heavy iron rolls were drawn forward and backward over a horizontal plate.

In the beginning, gunpowder was ground to a powder more or less fine. It was soon perceived that this formed dust, attracted moisture, and was easily caked. In consequence, graining was decided on, and this was first done in France in 1525. Before drying, it was pressed through a screen, and the different sizes were distinguished according to the grain.

‖ *Kernhistorie aller freien Künste*, etc., p. 572.

Of course, as the use of Gunpowder became general, it attracted more or less of royal attention. Thus, in 1439, we see Archbishop Günther, of Magdeburg, making the preparation of wall saltpetre a royal prerogative; and in 1520, Gustavus I., of Sweden, decreed that the soil of cemeteries should be leached to produce saltpetre. In 1561, there were 22 saltpetre works in Sweden, and there are notes on the subject in Erker's *Beschreibung Allerfürnemisten mineralischen Erts und Bergkwercksarten*, page 125 *b*; Prague, 1574.

In 1602, it was ascertained how much saltpetre was to be had from a certain amount of earth in Sweden. In 1605, a decree by Henry IV., of France, was published on the manufacture and refining of saltpetre, and, in 1642, the delivery of a certain quantity of saltpetre was made a tax in Sweden. In England, in 1626,¶¶ the manufacture of saltpetre, says the King (Charles I.) had hitherto produced much trouble and grievance to the lieges, "by occasioning the digging up the floors of their dove-cotes, dwelling houses, and out-houses; and had also occasioned great charge to the saltpetre men for removing their liquors, tubbes and other instruments, and carrying them from place to place, but now divers compounds of saltpetre can be extracted by other methods, for which Sir John Brooke and Thomas Ruffel, Esq., have received letters patent."

To encourage so laudable a project, "all our loving subjects," continues his majesty, "inhabiting within every city, town, or village, after notice given to them respectively, shall carefully and constantly keep and preserve, in some convenient vessels or receptacles fit for that purpose, all the urine of man during the whole year, and all the stale of beasts which they can save and gather together whilst their beasts are in their stables and stalls, and that they be careful to use the best means of gathering together and preserving the urine and stale, without any mixture of water or other thing put therein. Which our commandment and royal pleasure, being so easy to be observed, and so necessary for the public service of us and our people, that if any person be remiss thereof we shall esteem all such persons contemptuous and ill affected both to our person and estate, and are resolved to proceed to the punishment of that offender with what severity we may."

1630. Patent granted in England to David Ramseye, "to multiply and make saltpetre in an open field, in fower acres of ground, sufficient to serve all our dominions."

In 1755, a premium of 4,000 livres (pounds) was offered for the best work on the production of saltpetre, which premium was later on doubled.

In 1788, Lowiz, as well as Godolin, rendered great services in the purification of saltpetre, the latter introducing the refining of large quantities. As late as the second half of the seventeenth century, the proportion of the ingredients of gunpowder was determined solely by custom. De la Hire, Papin, Bernoulli, Huygens, Anderson, and Bigot de Morogues are among the first investigators who looked into the subject, though the teachings of Galileo and Toricelli perhaps served as their foundation.

The ingredients of gunpowder were at that time:

| | | | |
|---|---|---|---|
| In France, | $75^5$ saltpetre, | $12^5$ sul., and | $12^5$ C. |
| " Spain, | 78 " | 13 " | " 11 " |

In 1742, Robins appeared with his theory of the ignition of gunpowder. However, Robins and, after him, Maffei, Vandelle, De Saluce, D'Arcy, Lambert, Nollet, and Antoni only took into consideration the quantity and force of expansion of the gases, without chemically examining them. Mayow (1669), Stahl (1720), Priestley (1774) and Scheele (1778) were the ones who chiefly cast light upon the chemical phenomena involved in the burning of gunpowder, and Ingenhouss, Foureroy, Berthollet, Achard and Gren studied the proportions of the ingredients to be taken, as well as the phenomenon of burning. The greatest achievements in this province we owe to Lavoisier (born 1743, died 1794), who, in consequence of experiments on the burning of powder made in 1777 to 1778, was enabled to shape his famous theory. Experiments made in France resulted in a mixture of 16 parts nitrate of potash, 3 parts carbon, 1 part sulphur, for the strongest powder; the other countries in general adopted this proportion, though, of course, variations were made according to the special object in view and the character of the ingredients used. Don Barcelo (1784), Minando (1789), Baine (1789) and Wurzer (1792) attempted to heighten the effect of powder by admixing other substances. As we come up to the questions involved in to-day's consideration of explosive compounds, we must remember that firing by electricity was mooted long since, though it has only lately come into general use. It was proposed by Franklin in 1751, and by Priestley in 1767. (See *Quarterly Journal of the Chemical Society of London*, 1862, vol. xiv., p. 165.)

Moses Shaw, of New York, first practically carried the idea into effect in 1829, and, on June 3, 1830, he took out a patent "for blowing off very large masses of rock by making a number of simultaneous explosions; to effect which a number of holes are to be bored, which may stand around in a circle, and be so inclined as to point to one common focus. A priming compounded of fulminating silver and gunpowder is to be ignited by a shock from the electrical machine, there being a suitable arrangement of wires for that purpose." (*Journal of the Franklin Institute*, Philadelphia, October, 1830. See also *Silliman's Journal*, vol. xvi., p. 372.)

Further, according to the above reference in the *Journal of the Franklin Institute*, in the words of the patent, it is claimed for the process that "its superiority and usefulness consist in enabling operators to burst off large masses of rock, etc., by igniting a number of charges at the same instant."

(TO BE CONTINUED.)

THE MARYLAND MINE INSPECTOR.—It is understood that Owen Riordan, who was formerly Justice of the Peace in Westernport District, No. 8, succeeds Mr. Cain as Mine Inspector.

A NEW GAS PROCESS—UTILIZING WASTE.—The Central Railroad of New Jersey has put up near the station at Communipaw a small building to test a new process by which it is claimed that illuminating gas can be very cheaply made. The material used is old, oily waste collected along the road and mixed with chips and shavings of hard-wood from its shops. The fuel used to heat the retorts is old ties and cinders from ash pits (the company uses anthracite coal exclusively for its engines). The residue left in the retorts after the gas is extracted is very good charcoal from the wood, while the charred waste is said to be a good fertilizer. The cost for fuel and materials is certainly very small and the gas is said to be of a very good quality.

¶¶ Weale's *Quar. Papers on Engineering* vol. v.

## THE NEW WORKS AT CLAUSTHAL FOR DRESSING ORES.

Written for the Engineering and Mining Journal by John C. F. Randolph, E. M.

[*Continued from page* 150.]

(WITH SUPPLEMENTS—NOS. IV. AND V.)

### THE BUILDINGS.—CONTINUED.

*The Fine Separation House* (Figs. 7, 8, 9 and (2) on general plan of the works).—The material to be sized enters the building mixed with water from the zinc funnels in the adjoining coarse separation house by the troughs *b b*. These troughs, on entering the building, connect with the feeding launders, *c c* and *d d*, which are so arranged that the stuff entering on one side of the building may be directed at will to either set of screens. The screens are in sets of five, all conical and arranged pyramidally. The large end of each screen delivers to the small end of the next. The different sizes from the screens go to the bins, *g*, with horizontal bottoms on account of want of room. From these bins the contents go by cars down the incline—(22) general plan—to the fine jigging house. A portion of the stuff below 1$^{mm}$ is caught beneath the last screen by a zinc funnel, and being enriched on the two-sieved sand jigs, *i i*, flows off to the auxilliary washing house. The overflow from the funnel, the screens and the jigs goes to a clearing tank under the floor, and is afterward used on a lower level. The power for this house comes directly from the main shaft of the coarse separation house adjoining, from which it is transmitted to the lower drum of each set by belting.

*The Coarse Crushing House* is shown by Figs. 10, 11 and 12, and is marked (6) and (6) in the general plan of the works. The coarse crushing house, which is driven by a turbine, is here figured, which contains but one pair of crushing rolls, with room for another, not yet erected. The ore for coarse crushing is brought from the storage bins on the ore ground, or directly from the picking houses *i* and *k*, into the upper part of the building by the track *q*. It is dumped from the car into the feeding hopper above the rolls. To prevent the rolls at any time working empty, as the ore has to be brought a long distance, this bin is made very large. To save room the ore is fed from the bottom of the hopper by a sliding plate, to which a very slow movement is given by a crank connection. The ore falling between the rolls is crushed, and falls in about equal quantities into either side of a two-armed chute, each arm of which leads to one set of coarse sizing drums below. These drums are similar to the coarse sizing drums in the coarse separation house. All the stuff below 4·22$^{mm}$ is caught in a zinc funnel beneath the lowest drum of each set and is carried off directly by the launder *t* to the fine drums in the middle and fine crushing house below. All the sizes from the drums are caught in the bins *w* with sloping bottoms and sliding doors. The manner in which the power is transmitted from the two turbines and all other details, are shown with sufficient clearness in the drawings to require no further description.

*The Coarse Jigging House* is shown by figures 16, 17, 18, 19, and is marked (7) on the general plan. It contains nine double-sieved, continuous coarse jigs, *a*, and four single-sieved coarse jigs, *b*. The material for coarse jigging, coming from the coarse separation and coarse crushing houses, enters the building on the second story by cars, and is dumped directly into the hoppers of the two-sieved jigs. The middle product from these jigs is returned by the elevators, and dumped into the hoppers of the one-sieved jigs for rejigging. The water for jigging comes from the settling tanks below the floor of the building above, and, having been used for jigging, is drained from the receiving bins of the jigs, as has already been described in speaking of the special dispositions of the jigs. From the jigs it goes by the troughs *u u*, beneath the floor, to the settling tank *s*. At the end of the building are two elevators *c c*, for raising buck middlings and finished products. The power for driving the apparatus in this building is given by the main shaft *d*, to which power is transmitted from the building below by the band wheel *e*. Fig. 18 shows a section, *G H*, with the mode of transmission of the power from the main shaft to the jigs. Fig. 19 is a section through the elevators at the end of the building, and shows the manner in which belting is applied.

(TO BE CONTINUED.)

## NEW PATENTS.

The following is a list of the new inventions relating to Iron, Coal, Mining Machinery, Chemical Apparatus and the treating of Precious Metals, etc., from the official *U. S. Patent Gazette*, for week ending February 12:

| *No. of Patent.* | *Title of Invention.* | *Name of Inventor.* | *Residence.* |
|---|---|---|---|
| 200,119 | Safety Valves | Henry G. Ashton (a). | Somerville, Mass. |
| 200,134 | Processes for Utilizing Zinc Sulphate | Const. Fahlberg | Baltimore, Md. |
| 200,139 | Burners for Fuel | James M. Hicks | Summit, N. J. |
| 200,140 | Lifting Jacks | Amos J. Landis | Columbus C'y, Ind |
| 200,144 | Drop Weights for Oil Wells | M. T. McCormick | Petrolia, Pa. |
| 200,148 | Unloading Rails and Ties from Cars | Daily S. Moore | Chicago, Ill. |
| 200,164 | Torpedoes for Oil Wells | Joel S. Boyer | Lamartine, Pa. |
| 200,168 | Processes of Manufacturing Oils from Organic Substances | Duncan M. Buie (b). | Wilmington, N. C. |
| 200,182 | Processes of Manufacturing Gas | L. A. de la Peyrouse. | London, Eng. |
| 200,185 | Pumps | Samuel. B. Elzey | Hope, Arkansas. |
| 200,193 | Miners' Squibs | George Hayes | Girardville, Pa. |
| 200,195 | Furnaces for Link Welding | John Henry Helm | Allegheny, Pa. |
| 200,245 | Hydraulic Motors | James M. Bois | Salamanca, N. Y. |
| 200,272 | Explosive Compounds | Samuel J. Fowler | Westfield, Mass. |
| 200,285 | Boring and Drilling Apparatus | Julius Hall | Middlesex, Eng. |
| 200,294 | Sectional Steam Generators | Hermann Heine | Berlin, Prussia. |
| 200,310 | Devices for Supplying Steam and Air to Blast Furnaces | E. A. Jones (c). | Indianapolis, Ind. |
| 200,329 | Well Tube Clamps | F. B. O'Donnell (d). | Franklin, Pa. |
| 200,335 | Ore Amalgamators | Ira M. Phelps (e). | Philadelphia, Pa. |
| 200,336 | Ore Crushers | Ira M. Phelps (f). | Philadelphia, Pa. |
| 200,345 | Friction Drums for Hoisting Machines | John Rushworth. | New York, N. Y. |
| 200,350 | Steam Pump Governors | Chas. A. Sellon | New Hudson, N.Y. |
| 200,354 | Lifting Jacks | James W. Stevens | Roundhead, O. |
| 200,357 | Working Barrels for Oil Wells | Edward E. Swett | Olean, N. Y. |
| 200,360 | Ore Separators | Septimus Thomas | Philadelphia, Pa. |

(a) Assignor to Ashton Valve Company, Hartford, Conn.
(b) Assignor to himself and James F. Post, Wilmington, N. C., and D. D. Barber, Mayesville, N. C.
(c) Assignor to Eureka Blast Company.
(d) Assignor (one-half right) to George W. Sutley, Franklin, Pa.
(e and f) Assignor (part of right) to Theodore L. Chase and H. J. Fillman, Philadelphia, and D. K. Allen, Boston, Mass

## THE EMMA MILLER MINING DISTRICT, MONTANA—A NEW BONANZA.

By Wm. P. Wheeler, U. S. Marshal.

Considerable excitement prevails just at present over new and rich developments in gold quartz, near Helena. I give you a brief description of what has been done in the district, which has been entirely developed within a year past.

The district is named by the miners the Emma Miller Mining District; is situate 20 miles northwest from Helena, on the very summit of the Rocky Mountain Range, about 7.000 feet above the sea level.

The mine, which has made its owner, N. S. VESTAL, suddenly rich, is named the Penobscot. The discovery shaft is situated at the exact summit of the mountains, and ten feet *east* from it the water runs into the Pacific, and ten feet *west* it flows into the Atlantic. This fact is owing to the peculiar curve the mountains make at this point. The general trend of the range is from S. E. to N. W. The shaft sunk at the discovery is 80 feet deep and has yielded Mr. VESTAL about $7,000, which has more than paid expenses, and a large body of ore is yet left on the dump to be worked. From this point, running east, (on the west side of the range,) some 360 feet distant, he has sunk a shaft 40 feet deep, showing a fine body of ore, which is worth about $30 per ton. Most of it lays on the dump. About 350 feet farther east, (still on the west side of the range,) the third shaft is the great bonanza of the district. In 23 days, from January 20 to February 13, five men sunk a shaft 25 feet in depth, the ore from which was worked in a small five-stamp mill and two arastras.

To-day, in L. H. HERSHFIELD'S Bank, at Helena, the bar cast from the retort weighs 1,118 oz. Fineness, 730. Value, a little over $17,000; not over sixty per cent. of the gold in the rock was saved. The tailings were saved and will be worked over in the Spring, when the Fruevanner concentrator arrives. The width of the solid vein at 25 feet deep is 13 feet, and the average value is equal to that which has been worked. The core, about 18 inches wide, is much richer, and has been laid aside. It will assay from one to two thousand dollars per ton in gold, and about $600 per ton in silver, and will not be worked until new and better machinery is erected next summer. The yield will be astonishing.

Mr. VESTAL owns the entire lead alone, the Penobscot and the Western extension, called the Snow Drift, 3,000 feet in all, which is probably the most valuable mining property in Montana owned by any person. A month ago he was a good deal in debt and considered himself a poor man.

The Penobscot Lead is just over the top of the main range of the Rocky Mountains enough to be in Deer Lodge County, while the extension, the Snow Drift, is in Lewis and Clerk Counties, on the eastern slope.

The Blue Bird Lead, in the same district in Lewis and Clerk Counties, is one and a half miles northeast from the Penobscot, and is owned by COTTER & Co. It has a 90-foot shaft, showing a 9-foot vein and 50 feet of levels. 700 tons of ore have been worked in the last year in the ten-stamp Belmont Mill and five-stamp Courtright Mill, and have given an average of $28 per ton.

One mile northeast from the Blue Bird, in Lewis and Clark Counties is the Belmont Lead, owned by VESTAL, STOCKRIDER, LAHEY & GRIDDELL. Three tunnels have been run in on the vein. The highest or upper one is in 175 feet and 125 feet from the surface. The second tunnel is in 230 feet and taps the vein 175 feet from the surface. The third tuunel is in 80 feet and taps the vein 215 feet from the surface. The fourth tunnel has just been started and will tap the vein 315 feet from the surface. During the past year 700 tons of the ore has been worked in the Belmont Mill and yielded in gold $11,507.

The Emma Miller Lead, which gives the name to the district, is owned solely by Captain Sears; has been worked on two years, and has produced $12,000. Ore abundant, and runs $12 to $15 per ton. All has been crushed in an arastra at the mine.

The Stemple district is one and a half miles from the Belmont mine. The principal mine is the Whippoorwill. Has three shafts, 100 feet each in depth, and 500 feet of levels. Has been partly worked for three years in arastras; $18,000 has been taken out. Ore averages $25 per ton; vein is four feet wide.

The Northern Light is the western extension of the Whippoorwill; shaft 116 feet deep, and has 70 feet of levels. Ore averages $25 per ton; yield in the year past, $9,000. Worked in arastra.

This gold district is remarkably rich, and numerous leads have been discovered but not prospected. Next summer a 40-stamp mill will be erected, and hundreds of prospectors will cover the mountains with their work.

HELENA, Montana, Feb. 18, 1878.

## REVIEW OF THE CALIFORNIA MINING INDUSTRY FOR 1877.

(*Concluded from page* 130.)

*The Mines of Inyo County.*—These mines have had a checkered career, extending back to the date of their discovery, some sixteen years ago. The first permanent success achieved here was in the smelting of the argentiferous galena ores at Cerro Gordo, in what was known as the Union Consolidated group of mines.

*The Panamint Fiasco.*—The discovery, four years ago, of rich and what it was hoped would prove permanent deposits of argentiferous ores in the Panamint district, lying in the southerly part of Inyo County, gave a new impetus to prospecting and drew into that region a numerous population, some of our heavy capitalists and most sagacious mining men having previously invested largely in the district. Encouraged by the surface exhibitions of ore, the old-time mistake of building roads, towns and mills before any thorough vein exploration had been made, was here committed, and yielded its customary harvest of disappointment, failure and financial collapse.

*The Darwin Mines.*—There are now in this region some dozen or more furnaces, the most of them of fair capacity, for reducing the smelting ores, with about an equal number of mills for crushing the free ores. The principal mines are equipped with steam hoisting works and in several of them quite large and rich ore reserves have been developed, and we shall be disppointed if Inyo does not double her bullion yield the incoming year. Among the best outfitted, most thoroughly exploited and promising properties in the county are the Emigrant Company's group of mines, with a five-stamp mill in Lee District. The ores here are extremely high

Fig. 7

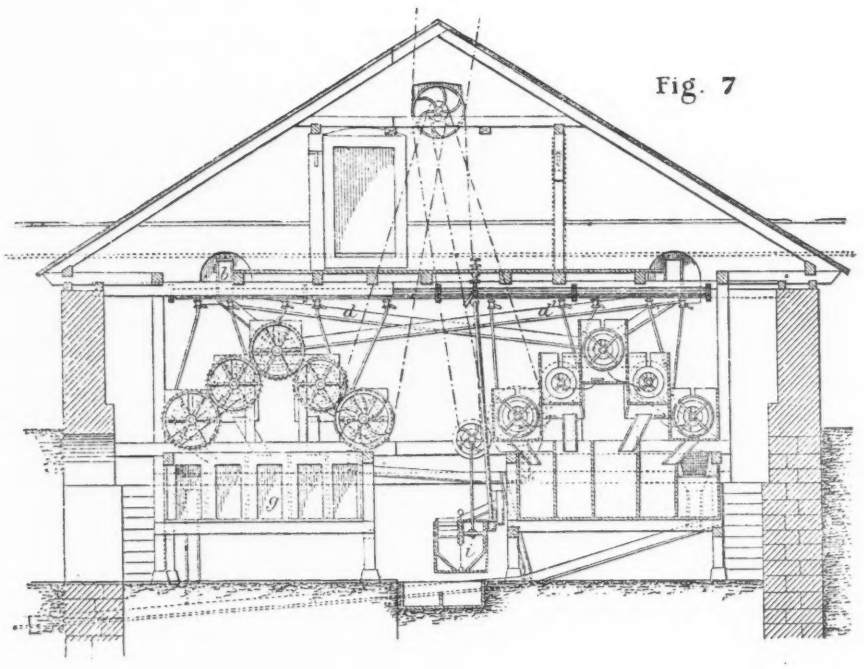
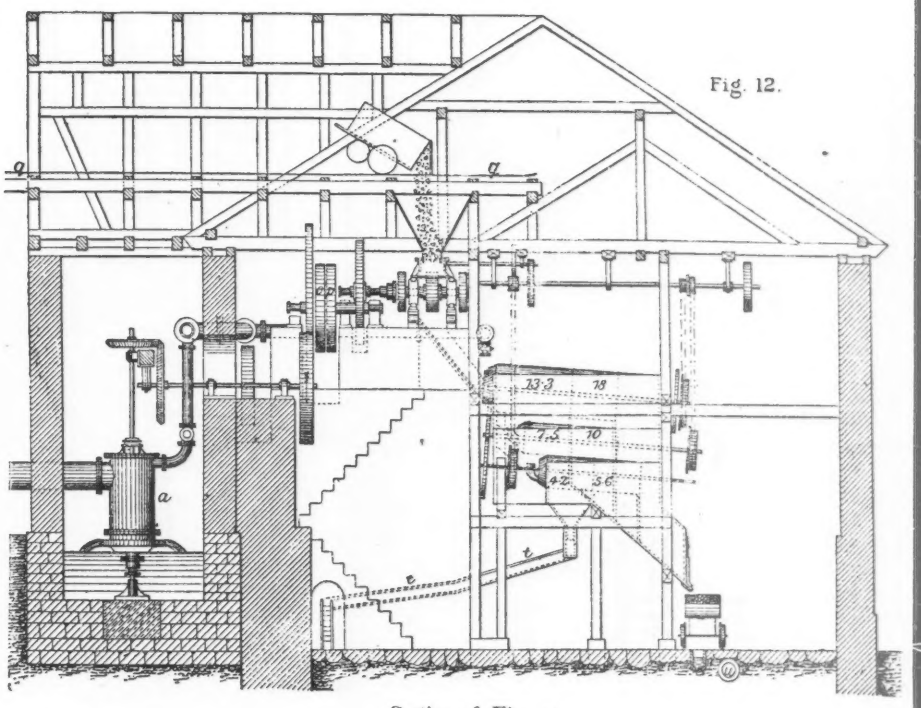


Fig. 12.



*Section of Fig. 10.*

Fig. 9

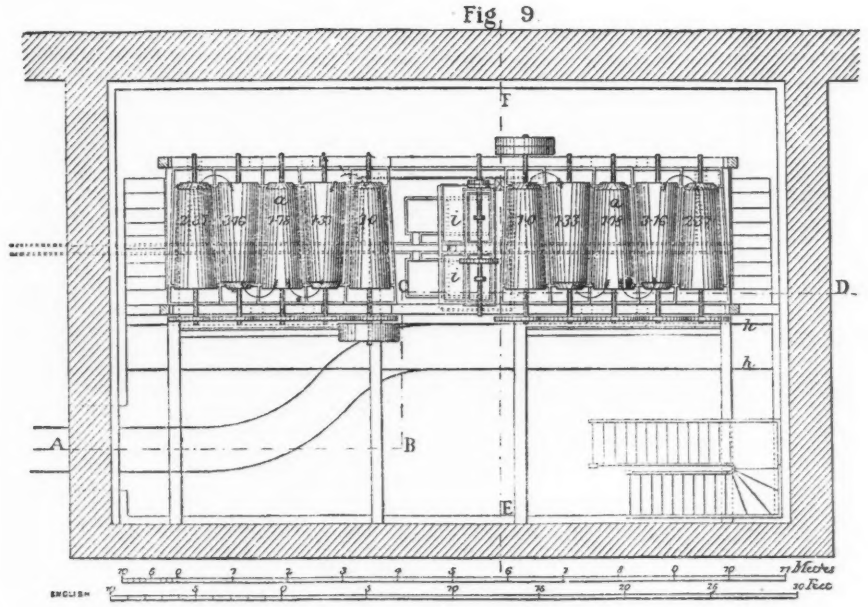
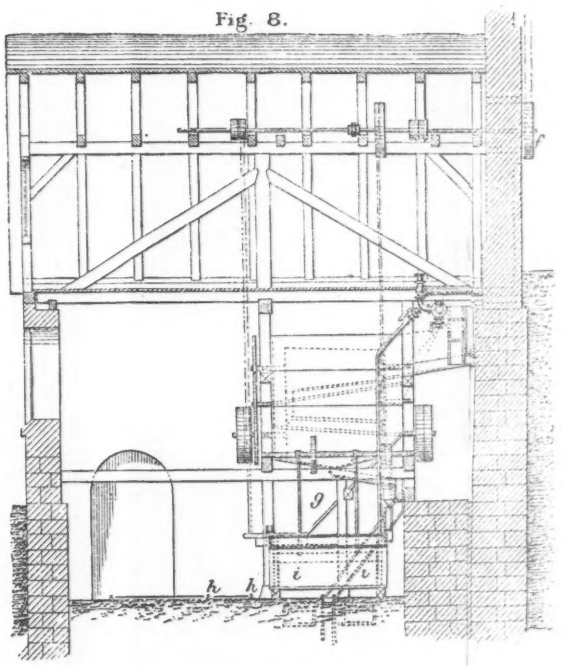


Fig. 8.



*Section of Fig. 7.*

REGISTER.

*Figs. 7, 8, 9—Fine Separation House.*

*" 10, 11, 12—Coarse Crushing House.*

Fig. 12.

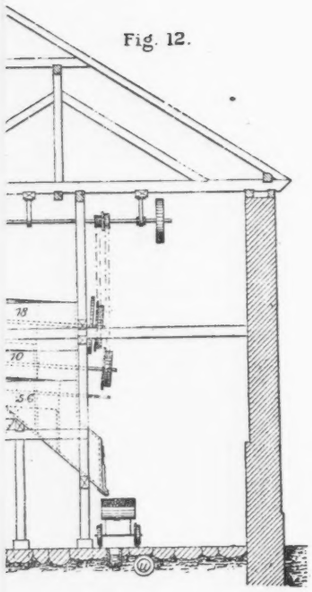
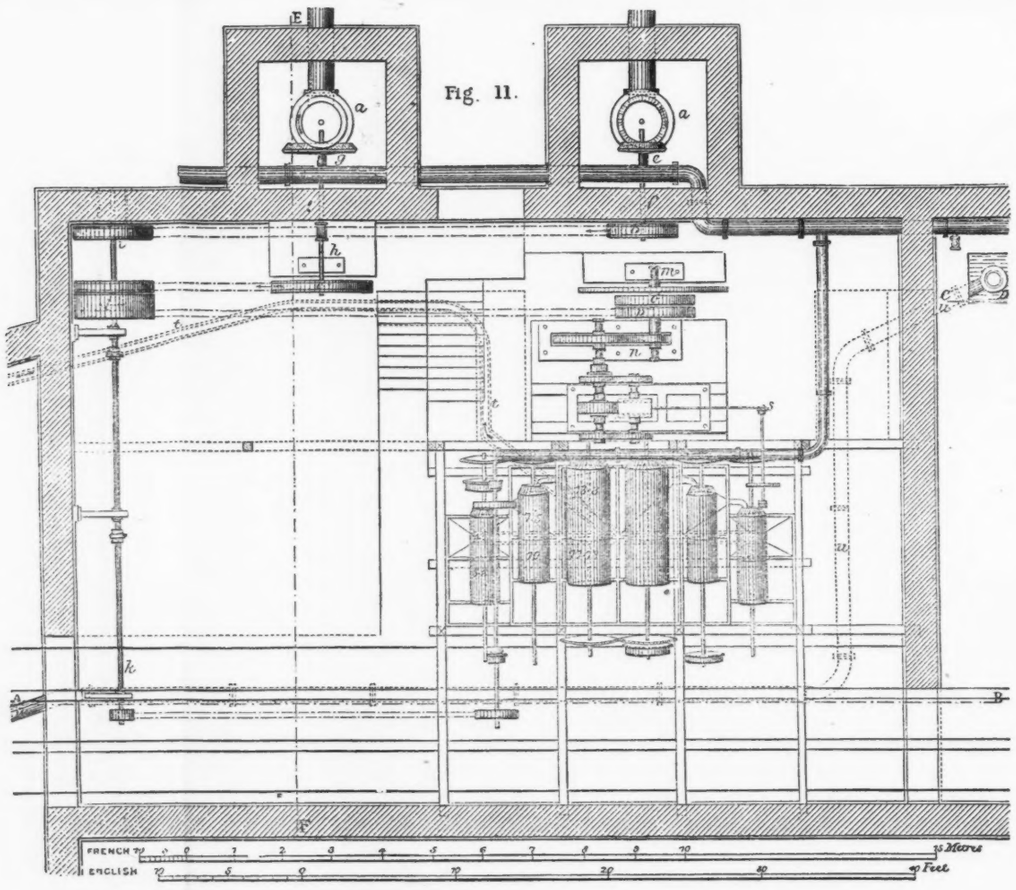


Fig. 11.



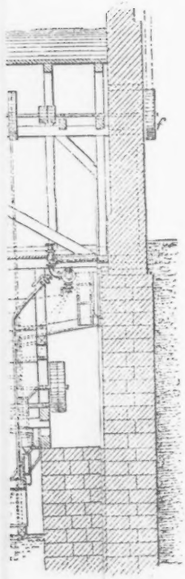
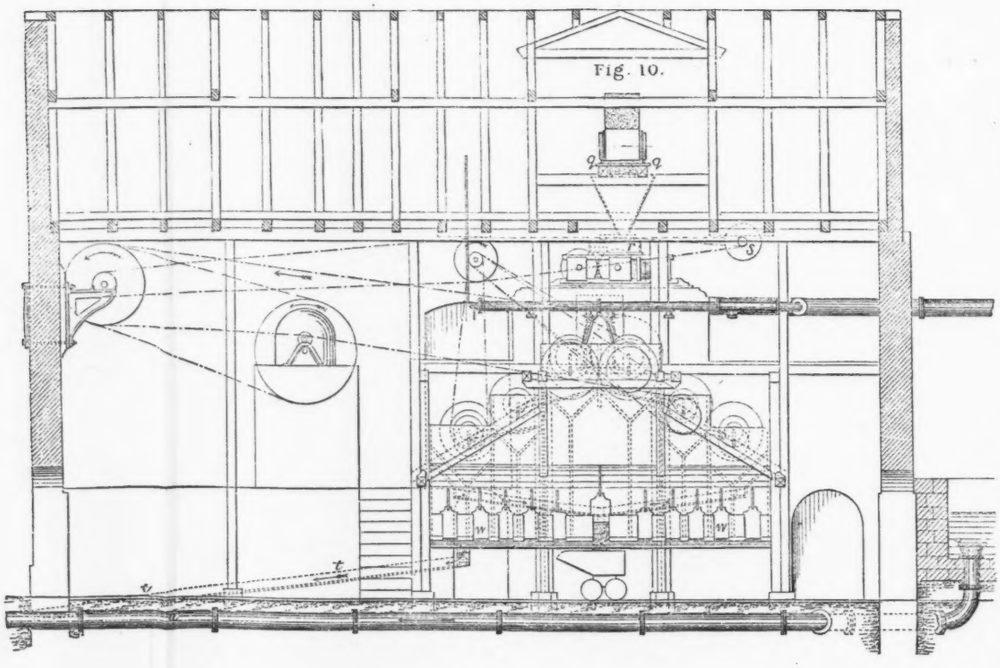



Fig. 10.



WORKS AT CLAUSTHAL.—No. IV.

grade and very docile, but the country suffers from scarcity of wood and water. The mines are yielding at the rate of about $10,000 per month, a production that might be greatly enlarged with a proportionate increase of milling capacity; the Union Consolidated running one furnace; the Modoc, having two furnaces, one of them running; the Minietta and the Rex Montis, free ores and outfitted with mills, now in operation; the Defiance, running two furnaces with some interruptions, bullion assaying $200 per ton and tending more to silver and less to lead; the Eclipse (English Company), a fine property, but a good deal embarrassed by financial and legal troubles, and for the present running their large mill on custom ores; the Santa Rita, Cuervo, Kearsarge, etc.

*San Bernardino and San Diego Counties.*—The only districts that seem to have given evidence of much vitality in these counties the past year are the Julian and Banner, in the San Diego Mountains, and the Ivanpah and Resting Springs, lying two hundred miles in a northeast direction from the town of San Bernardino, and on the northerly border of the great Mohave Desert. In the San Diego mines, the most of the small mills, some ten or twelve in number, have been kept steadily and profitably running the past year. While the most of the ledges here are comparatively narrow, the mineral deposits give good signs of permanence. The ores worked are usually of high grade, yielding by the common mill process from $30 to $90 per ton. The principal group of ledges in the Ivanpah District, where the ores run well in gold, silver and copper, have been sold lately to a New York company.

*El Dorado County.*—After a general depression of mining, extending over many years, a revival of this industry has of late taken place in El Dorado, a result due chiefly to the completion of the several large canals that have been in course of construction here for several years past. In this class of enterprises three companies have distinguished themselves by the magnitude of their works, their heavy expenditures, and the pertinacity displayed in carrying these several projects through and placing them on a paying basis.

The canal system of the California Water Company, on which operations were commenced five years ago, has only within the past year been so far advanced as to make its beneficial influence largely felt. This company have expended in the purchase and improvements of their property, situated on the Georgetown Divide, something like a million dollars.

The most of the water is derived from a series of deep lakes, situated at a great altitude in the Sierra Nevada Mountains, some portions of which are here covered with perpetual snow. This water is delivered on the ridge lying between the South and the Middle Forks of the American River, and is designed to be used for both agricultural and mining purposes. In addition to water franchises, ditches and properties appurtenant, this company own here large tracts of auriferous gravel, quartz lodes and other forms of mineral deposits, farming lands, etc.

The El Dorado Water and Deep Gravel Mining Company, organized four years ago, with headquarters in San Francisco, has constructed 150 miles of large-sized ditches, besides many smaller ones for distributing purposes, the entire cost of which, including reservoirs, etc., approximates one million dollars. Their water franchise covers the ownership to some twenty lakes, many of them of considerable magnitude, and all situated at a great height on the Sierra Nevada. While these works were in course of construction, a period running through several years, the Company employed steadily from one thousand to twelve hundred men, their labor force since comprising for the greater portion of the time about 200 men. This enterprise, besides proving a good investment to the owners, has already greatly benefited the more populous portion of El Dorado County, property values of all kinds having appreciated fully twenty per cent. since the completion of the company's main ditches.

With these improved chances for a full and unintermitted water supply, prospecting has been resumed and is going on at a lively rate in many of the old and nearly forsaken camps, the decaying towns are recovering something of their former importance, and capital is being invested in this county at a rate not witnessed before for many years. Quartz claims that had been abandoned have recently been relocated, while work upon the live mines has been considerably accelerated. Idle mills have, in some instances, been started up, while preparations are being made for others to follow, and there is every likelihood that a decided impetus will be given to quartz mining in this county the present year.

## NOTE UPON THE COST OF CONSTRUCTION OF THE "CONVERTING WORKS" OF THE EDGAR THOMSON STEEL COMPANY, OF PITTSBURG, PA., 1873-75.

By P. Barnes.

[A paper read before the American Institute of Mining Engineers, at Philadelphia, February 28, 1878.]

Some statements have already been made to the Institute in reference to the cost of other departments of the above-named works, and some details have been given in tabular form. For these reference may be made to the ENGINEERING AND MINING JOURNAL, Vol. XXIII., p. 439, and Vol. XXIV., p. 419.

For the purpose of the present paper, it may be sufficient to say that this "Converting Works" is made up of three buildings—a cupola house, an engine house, and a converting house.

The machinery and fixtures comprise two blowing engines, two pressure pumps, two five-ton converters, five hydraulic cranes, three pig-iron cupolas, four spiegel cupolas, two lifts for the cupolas, together with the usual arrangements of smaller parts.

Every effort was made in the construction to combine efficiency of operation with durability, and the general course of the operation of the works during two and a half years seems to warrant the belief that the large outlay has been fully justified.

SUMMARY OF TABULAR STATEMENT OF COST.

*Buildings:*

| | | | |
|---|---|---|---|
| Stone | $7,134 | Castings | $4,539 |
| Sand and cement | 2,885 | Teaming | 3,081 |
| Red brick | 7,747 | Skilled labor | 8,430 |
| Brick laying | 1,623 | Common labor | 5,129 |
| Lumber | 4,652 | Other items | 1,730 |
| Roofs | 13,880 | | |
| Bar iron | 1,070 | Total | $61,900 |

*Blowing Engines.*

| | | | |
|---|---|---|---|
| Engines | $36,515 | Other items | $3,629 |
| Receiver | 1,195 | | |
| Labor | 1,403 | Total | $42,742 |

*Pressure Pumps.*

| | | | |
|---|---|---|---|
| Pumps | $7,539 | Labor | $864 |
| Regulator | 2,327 | Other items | 949 |
| Receiver | 1,375 | | |
| Total | | | $13,106 |

*Cupola Blowing Engines.*

| | | | |
|---|---|---|---|
| Engines | $5,075 | Other items | $1,051 |
| Total | | | $6,126 |

*Cupolas.*

| | | | |
|---|---|---|---|
| Stone | $23 | Shell iron | 6,671 |
| Sand and cement | 101 | Tadles | 1,280 |
| Fire brick | 1,614 | Scales | 750 |
| Plate iron | 484 | Teaming | 117 |
| Hardware | 419 | Skilled labor | 1,114 |
| Castings | 736 | Common labor | 506 |
| Iron beams | $301 | Other items | 118 |
| Total | | | $14,234 |

*Converters.*

| | | | |
|---|---|---|---|
| Stone | $591 | Rotating fixture | $9,700 |
| Castings | 1,450 | Labor | 2,894 |
| Chimneys | 1,877 | Other items | 1,754 |
| Converters | 15,087 | | |
| Total | | | $33,353 |

| | | | |
|---|---|---|---|
| Cranes | $23,636 | Spiegel furnaces | $3,629 |
| Cupola lifts | 3,801 | Melted from lift | 41 |
| Floors | 8,701 | Blast pipes | 1,027 |
| Small machines | 8,549 | Tools | 1,134 |
| Total | | | $40,518 |
| Grand total | | | $221,979 |

## MINING NEWS.

COLORADO.

Our special correspondent sends us the following summary of Colorado news:

A wonderfully rich vein of ore has been developed since October last on the Dunderberg lode on the Sherman Mountain east of the Terrible and three miles from Georgetown. From December 8, 1877, to February 1, 1878, 122 tons of ore of an average yield of 275 ounces of silver per ton were mined, making a total yield of $32,725 in seven weeks on a newly opened vein with a small force of men. In three days, ending February 23, the yield was over $4,000. The miners of the Terrible broke into the workings of the Dunderberg ten days ago. The leasers of the latter claim this was done by a cross cut, and that the Terrible and the Dunderberg are not one and the same vein.

The Kirtley lode was discovered in November last by the Kirtley tunnel, then 650 feet long. This is on Leavenworth Mountain, in the vicinity of the rich S. J. Tilden and O. K. lodes. Some think the Kirtley is the Tilden cut at a considerable depth. The latter shows another valuable pocket in the shaft now being sunk. Most of this ore has yielded over $1,000 per ton. The Kirtley is producing from $400 to $500 per day.

On Red Elephant large quantities of rich ore continue to be taken from the Free America and Boulder Nest Lodes. The shaft of the former has been sunk to a depth of 280 feet, where a second rich ore body has been opened, which yields about $200 daily. The Boulder Nest sent 40 tons of ore to the smelter last week, of an average value of 200 ounces per ton (worth altogether $9,600), from the ground leased by Tooker & Co. alone. Beside this the same firm sends, weekly, from 40 to 75 tons of low grade ore, worth from $36 to $55 per ton, to the Clear Creek Company's concentrating works. One or two other leasing firms, on this same lode, are shipping considerable ore. The Tooker Shaft, 170 feet deep, has lately entered a larger body of ore than was producing during the first part of February.

The Comstock Lode, of Central City, gave a profit of over $1,000 in February, in sinking a shaft and running one short drift. The shaft is now 450 feet deep, and the above profit was shown while a Knowles pump and other improvements were being put up in the mine. The product of December was $5,100. The yield is about eight tons of ore daily, worth from $10 to $20 per ton.

The Melvina, the richest and most profitable of the telluride lodes of Boulder County, gave an unusually large production in February. The ore sold at the smelting works at Black Hawk brought a little over $10,000.

Considerable excitement has arisen in Clear Creek County over the rich silver discovery made on the southwest side of South Clear Creek, opposite the famous Red Elephant Mountain. A vein eighteen inches wide and said to yield 500 ounces of silver per ton has been found there close by Silver Creek. The result is, over one hundred prospectors have flocked to that locality.

The three principal districts of the San Juan country are Mount Sneffles in Ouray County, the Animas in San Juan, and the Lake City in Hinsdale County. The first named has the richest and probably the most valuable veins, but as yet no reducing works have been brought into successful operation in that county. This want will probably be met during the coming summer. Last season some of the best ore, such as that from the Wheel of Fortune, "Sam Begole's Patch," etc., was sent to Lake City, most of the way by pack animals at an expense of $45 per ton. The average yield of the three classes of Wheel of Fortune ore was 225 ounces per ton, and 20 tons gave an average of 800 ounces of silver. There are said to be over 6,000 silver mines on and around Mount Sneffles. The greater portion of the ores of this district are galena, carrying gray copper, and the tetrahedrite is invariably highly argentiferous.

The new works of the London and San Juan Lixiviation Company, eight miles north of Silverton, are expected to be at work next June. The process is that of Augustine. In the mill buildings are Blake crushers, ball pulverizers, a reverberatory furnace 60 ft. by 12, and leeching tubs and tanks. The capacity is said to be 15 tons daily. The ore supply will come from the Poughkeepsie, Helvetia, Columbia and other lodes and those of the Badger Tunnel, all leased or partly owned by the company owning the works.

More mining is being done among the San Juan silver mines than ever before during the winter season, but no reducing works have been running since the Ocean Wave works, near Lake City, shut down February 1. The Mountain Queen lode has over 500 tons of ore already out ready for shipment. This is a large vein running low in silver, but carrying from 50 to 65 per cent. lead. The Bonanza Tunnel, near Animas Forks, at an elevation of 11,500 ft. above sea level, has entered Mineral Mountain over 200 ft. The objective veins are the Boston, Yorktown, Equator, Burrows, Red Cloud, Queen Mary, Little Giant, Milwaukee, Hafer, Vermilion, J. B. Norris and others. At an elevation of 13,000 ft. ten men are at work driving a tunnel for the company owning the great Mastadon lode. This lode is often 300 ft. between walls and has been traced for nine miles. The Silver Wing mining property is said to be sold to Eastern parties for $250,000. The Susquehanna Tunnel has been driven 1,000 ft. into Hazelton Mountain, and its head is 1,200 ft. below the surface of the mountain side above.

Leadville, in Lake County, promises to be the most lively mining camp in Colorado this season. Its present population is 1,500, and is expected to be 5,000 before summer is over. Over 40 new buildings were put up there last week, and this settlement of eight months' growth already has a public school and regular religious services on the Sabbath. These carbonate of lead deposits are certainly of enormous extent, and the value of ore already mined must approach a round million in value. This does not embrace nearly $500,000 worth exported to St. Louis and Omaha last season. A stage line has already extended from Fairplay to Leadville. Three different railway companies are contemplating the extension of their roads to Leadville this summer, or as soon as such work can be completed. When these corporations propose to build a road from 100 to 150 miles in length, up mountain cañons and over lofty divides and a rugged country, the prospective importance of this carbonate of lead district must be immense. Only one or two of these lines will reach that destination; and the one getting the start will probably hold the advantage and deter others from approaching. F.

MICHIGAN.

*The Copper Mines of Lake Superior.*

(Continued from page 152.)

"SAGINAW MINE.—In Junction Shaft, which has rscently been sunk in this mine about 18 feet, the vein looks well, and in the other shaft, about 500 feet southwest from the Junction, and down about 14 feet, the vein is remarkably rich in very heavy stamp, or what might not be improperly called barrel copper. 300 feet northeast from the Junction

a winze is going down. The vein here is well defined, contains considerable coarse stamp stuff, and sheet copper is found adhering to the hanging wall in many places. The Superintendent believes the Saginaw will make a paying mine; that where he has encountered branch veins, similar to those crossing the Saginaw property, they have come into the main vein and enriched it, and it is his opinion that such will be found to be the case at the Saginaw.

"ISLAND MINE.—Operations at this mine are going forward all right. Better copper ground is reported in the second level going west.

"INTERNATIONAL.—No regular mining work has been carried on at this mine, the small product being the work of a few tributers working on the bluff. No work is being done in the mine, as it is full of water. This mine was organized on what was formerly known as the Bohemian Mine—one of the best on the lake—and is not at all likely to figure on the Boston or New York Stock Boards.

"AZTEC.—This mine is owned by Messrs. Rogers & Huddlestone, and worked by them on the tribute system, the largest proportion of the product being the result of tributers who have worked around on the outcropping of the veins on the bluff, or in pits where the ancients have formerly worked.

"MASS.—The Mass Mine comes to the front this year as the third producing mine in the county. The stamp mill has been running but a short time, but is doing good duty stamping up a large accumulation of rock, so that it is reasonable to suppose that for 1878 she will be the largest producing mine in the county, especially if a large force be employed, as they have all the veins open that cross the formation, and can work them cheaply by a deep adit.

"PHŒNIX.—At this mine the men seem as busy as bees. No signs of the fire which they had there last summer, the buildings being all replaced and more added. Everything around looks neat and trim; the houses are all in good repair and active preparations are being made for an increased output during the coming season.

"MINONG.—This mine is working a force of between twenty and thirty men, and the indications in the mine are very good.

"ROCKLAND.—The tributers working this mine have discovered what promises to be a very large mass, or several masses, of copper near the surface. A forty-ton mass was taken from this mine two or three years ago.

"FRANKLIN.—This company has erected a new trestle work at the stamp mill. The shaft houses, and other buildings around the mine, have had a general overhauling and are now in good repair. The stamp mill is now one of the best to be found in any mining country.

"RIDGE.—At present this mine is looking well underground, two good masses of between two and three tons having been brought up from the lowest levels. Yet with this production the mine has made no money, consequently cannot appear on the dividend list for 1878. Mining is being pr secuted on but one vein—that known as the Evergreen vein—which is well known here *not* to be the most productive vein on the property. The Champion and Knowlton veins both cross the property and if worked on a reasonable scale and with proper machinery and facilities for handling and treating the rock, could be made to return handsome returns for the money invested.

"COPPER FALLS.—A rich discovery has recently been made in this mine in the drift in the 140 fm. level, driving south of the Spencer shaft, the vein, which is looking fine, being heavily charged with barrel mineral or heavy copper and excellent stamp work. In the heart of the drift a fine-looking mass is exposed for almost ten feet, and it has every appearance of being very large in the sole of the level. This is the some vein that was struck years ago. We have heard reliable and disinterested mining men who have seen the vein give their opinion and they say it is as rich if not richer than that struck by Mr. Thomas. This company employs about thirty men.

"CENTRAL is working a force of about three hundred men. The company is putting in a man engine which is something that they never had before. The mine is about twelve hundred feet deep, and is looking well.

"ATLANTIC.—This company employs on an average about 350 men. The product of the mine for the past year was 1,440 633-2,000 tons of mineral, to produce which over 7,000 cubic fathoms of ground were broken. The yield of ingot from this enormous amount of ground was only 289 pounds per fathom—which will give our readers some idea of the immense amount of work required to attain that yield. We have it on undoubted authority that the net profit, even under the circumstances of uniformly low mineral percentage of the rock, and the low price for copper obtained during the past year, was something over $41,000, while over thirteen thousand dollars were expended in addition for needed improvements, which will materially lessen the future cost of production. The actual gross earnings of the company were, therefore, about $54,000 over and above the running expenses. The cost (apart from construction expenses) of mining and marketing the copper, was about 15¾ cents per pound. This cost is very low for a mine that yields less than one per cent. of ingot to the ton of rock stamped. The following table, showing the expense per cubic fathom of ground mined for the years stated, will be of no interest in this connection:

| | 1874. | 1875. | 1876. | 1877. |
|---|---|---|---|---|
| Total expenses per fathom mined | $62.62 | $61.61 | $53.10 | $47.46 |
| Construction expenses per fathom | ..... | 6.13 | 83 | 1.84 |
| Net running expenses and marketing per fathom | 62.62 | 55.48 | 52.27 | 45.62 |

Wages paid during the year have been as follows: Miners, per month, $50.01; surface men, $40.35; stamp mill men, $41.39; average price paid per fathom for stoping, $16.24; per foot for drifting, $11.83; for sinking, $36.24."

### MINNESOTA.

The party of tributers in this mine have a very fine mass of copper in sight, found in the old north vein near the surface. Another party of tributers are also reported to have found very good indications in the conglomerate. The other tributers in the mine are generally making fair wages, or getting a living. The company have started to work to furthur prove the value of the vein in the south bluff by stoping; they have also under consideration the advisability of sinking the shaft another 100 feet. It is now 100 feet below the adit level. The vein when first cut in the adit level was very wide, with a limited amount of copper discernible through it. In sinking the shaft the 100 feet, the vein was found to diminish in width materially as they went down, yet, at the same time, getting richer in copper.

THE TOTAL PRODUCTION OF THE LAKE SUPERIOR COPPER MINES is as under:

| | Tons. | Value. | | Tons. | Value. |
|---|---|---|---|---|---|
| 1845 to 1858 | 13,955 | $9,500,000 | 1869 | 12,200 | $5,368,000 |
| 1858 | 3,500 | 1,886,000 | 1870 | 12,946 | 5,696,240 |
| 1859 | 4,300 | 1,890,000 | 1871 | 12,857 | 6,171,360 |
| 1860 | 5,800 | 2,610,000 | 1872 | 12,132 | 7,774,720 |
| 1861 | 6,000 | 3,337,500 | 1873 | 14,910 | 8,200,500 |
| 1862 | 8,000 | 3,402,000 | 1874 | 17,780 | 8,180,800 |
| 1863 | 6,500 | 4,420,000 | 1875 | 18,352 | 8,390,860 |
| 1864 | 6,500 | 6,110,000 | 1876 | 19,224 | 8,266,320 |
| 1865 | 7,000 | 5,145,000 | 1877 | 19,886 | 7,556,680 |
| 1866 | 7,000 | 4,760,000 | | | |
| 1867 | 8,200 | 4,140,000 | Total | 227,027 | $117,397,980 |
| 1868 | 9,985 | 4,592,000 | | | |

### OREGON.

THE BAKER COUNTY GOLD MINES.—We take the following description of the mines of this county from the *Bedrock Democrat* of February 13:

Baker County, with its ten thousand square miles of territory, is the wealthiest gold-bearing portion of the State. The first gold was discovered in 1861, when the population was confined to a very few. The mines extend over nearly the entire area of the county. It is estimated that the gold production of the county amounts to $3,000,000 per year. The mines are generally placer, but quartz has been receiving attention of late, and is found exceedingly remunerative. The principal ledges and mines encircle Baker City, which is the depot of supplies, owing to its central locality. Within seven miles of this city the Virtue Gold Mining Company has established a twenty-stamp mill for crushing the quarts taken from its mine, the Rockafellow and Union lode. This was discovered in 1863; the ledge is two feet and a half wide, and has been entered to a depth of six hundred feet, yet it pays better now than ever, yielding $30 per ton. The mine and mill when running full force employs from seventy to eighty men. This mine will start up in full blast as soon as the Cornish pump now being built in San Francisco arrives. $9,000 was just cleaned up, the result of twelve days' run on rock taken out by men working on tribute. Twenty-five miles southeast from Baker City are the Burnt River mines, which employ about one hundred and fifty men in the mining season.

Rye Valley, one of the oldest camps in the county, has both quartz and placer mines. The placer mines extend over a large area, and employ from fifty to one hundred men in season. The quartz is sometimes very rich in silver.

Humboldt Basin is a town and mining camp. The mines, which embrace placer and quartz, are situated in what seems to be an ancient crater on the summit of Humboldt Mountain. Large nuggets have been found in this camp, and one picked up in 1876 was valued at $640. The mining season is short—from March to June—and the only water convenient is that produced by snow melted by the sun. They have been worked since 1862, and give employment to two hundred men, including Chinese. A quartz lode found there is well defined, and prospects well. Five miles southeast of this camp is Amelia City, a town in the midst of a large and wealthy mining district. There are about thirty gulches in this district which pay from $10 to $30 per diem to the hand. Water is plentiful and conducted to the mines by a ditch, which is four miles long.

The Shasta or Willow Creek mines, in the southwest portion of Mormon Basin, yield from $5 to $100 per diem to the hand. They are supplied with water by the Alder Creek ditch, which is forty miles long, and cost $50,000; and by the great canal of the Malheur and Burnt River Consolidated Ditch and Mining Company, which has a length of one hundred and twenty miles, a capacity of two thousand five hundred inches, and cost a quarter of a million dollars. Besides these there are two smaller ditches, which have a capacity of one hundred inches, a length of three miles, and cost $8,000. The mining season extends from March to December, and during that time from one to three hundred men are employed.

Bridgeport, a small town, and the headquarters of the Chicago Ditch Company, is in the midst of a placer country which extends for twenty miles up and down Burnt River. The ditch there has a capacity of fifteen hundred inches, cost $35,000, and supplies one hundred gulches in its course of thirty-five miles.

Clark's Creek mines, four miles southeast of the former, were discovered in 1862, and have been worked since by from two to three hundred men each season. They yield from ten to fifty dollars per diem to the man, and are supplied with water from the ditch of Virtue and Buckland, which has a length of ten miles, a capacity of four hundred inches, and cost $25,000.

Winters diggings, Gimletville and other camps extend along Burnt River a distance of forty-five miles and up into the Blue Mountains; the mines are in what is called the gravel vein and pay well. Nuggets valued at from $100 to $500 are found quite often. Water is scarce, and the main dependence is on melted snow; good quartz ledges have been found recently in Umpqua Gulch.

Auburn mining district was discovered in 1862, and for three years subsequently employed a population of from four to six hundred; it has yielded several million dollars and is still paying well. It is supplied with water from the Auburn Canal, which has a capacity of two thousand inches, a length of thirty miles, and cost $230,000. The Oro Fino lode in this camp prospects very largely; a tunnel four hundred feet long has already been worked, and the more progress made the better does it yield. The Marysville Mining and Water Company now owns the Auburn Canal, and is building a bedrock-flume, with good prospects for a first-rate paying investment.

Griffin's Gulch, eight miles west from Baker City, is the place where gold was first discovered in the county, in the autumn of 1861. It has yielded largely, but it now only employs a few persons. Washington Rean and other gulches have been mined since 1867, and are yet worked to advantage by two hundred persons. A fine quartz lode on Rean Gulch yields $30 per ton; it is crushed at the Virtue mine at Baker City. The former gulch is owned by Chinese, who earn an average of $5 per day. Salmon Creek mines yield from $5 to $20 per diem to the hand; the quartz ledges there have been worked a little. Water is supplied by three ditches, erected at a cost of $5,000.

Rock Creek mines, twelve miles north of the town of Pocahontas, which are extensive and promise to be lasting, yield from $10 to $50 per diem to the hand, during the mining season; water is supplied by the Rock Creek ditch, which has a length of six miles, a capacity of 500 inches, and cost $10,000. Good paying mines have been discovered recently on Conner Greek, forty miles southeast of Baker City, near Snake River. A quartz lode—the Eddleman—is one of the richest in the State; it is two feet and a half wide, and well defined. A ten stamp mill has been erected there. Baker County has over one-third of the population engaged in mining, and it may be safely estimated that twice the number could pursue it with profit. There is more enterprise manifested in the county than in any equal area on the coast, which is apparent from the fact that 260 miles of ditches, having a capacity of 7,350 inches, and costing about $648,000 have been built there, and that more are being constructed as rapidly as they are required.

### THE BLACK HILLS BONANZAS.

We take the following correspondence from the New York *Herald* of March 3:

SIDNEY, Neb., February 20, 1878.

The Black Hills are in everybody's mouth and in everybody's mind all through the West, and information concerning the locality is eagerly sought after. This is not to be wondered at when we consider the many conflicting stories afloat, reaching either the extreme of exaltation or the depth of deception and trickery. All through the past season daily egress from the Hills was made by parties who went in poor and unknown and emerged heralded and loaded with wealth. They pronounced the country a veritable bonanza; but by their side trudged many and many a footsore, heartsick, penniless man equally loud in their denunciations of the Hills. I propose to furnish the *Herald* a few facts, not based upon heresay or speculative evidence, but positive knowledge, and to assure your readers that I am abundantly able to supply them. Pardon the egotism, and allow me to state that no man has been longer in the Hills nor more thoroughly visited and prospected them than has your correspondent. It is no argument against what I shall say to recite that I came out as poor as I went in, for I went there as a journalist and not as a miner.

I predicate what shall follow upon the assertion that the Black Hills is the richest mineral country ever discovered upon the American continent. And possibly it is the smallest in area.

### SIXTY MILES OF GOLD.

The Hills proper are about one hundred miles in length by about fifty in width. The gold belt running from French Creek on the south, north thirty-five degrees west, magnetic variation, is about sixty miles in length and two miles wide. There are three distinct kinds of mines—viz., placer, hill or cement and quartz. The former is the "poor man's diggings," as they are readily worked, where water is had at a trifling expense and with an instantaneous yield; the second requires the outlay of capital in the construction of ditches or the introduction of stamp mills and other machinery, while the latter can be successfully operated only by capitalists and through the agency of improved mechanism and perfect science. The Hills, where invaded, are still largely populated by poor men; consequently attention was first directed to placer mining, from which the principal yield has thus far been secured. What that has been up to the present time we have no means of ascertaining, but a careful computation from such sources as we have, places it at about $4,000,000. This, all the world knows, was taken chiefly from Deadwood and its tributary gulches, albeit French, Battle, Spring, Rapid, Castle, Sand, Iron and Potato creeks have each contributed fair proportions. Deadwood is pretty nearly worked out—that is, the ground has been pretty generally all handled over once—but a company is now at work constructing a bedrock flume for the purpose of resluicing the gravel, and they expect and will probably secure better results, and with far less work, than at the original process. The quality of gold varies with the location from which it is taken. Deadwood gold is fine and very rusty; Spring and Rapid creek gold is flaky and very bright, while that taken from Potato and Nigger gulches is nuggetty, and the ground very spotted. Spring Creek gold is by far the most valuable, bringing from $1 to $1.50 per ounce in excess of that taken from other districts. The largest nugget found in the Hills thus far was discovered in Nigger gulch and weighed 147 pennyweights, and was valued at $140. The largest lump found in Deadwood was valued at $36. Placer mining will continue for several years yet, and will continue to yield handsomely.

### ROCK WORKINGS.

Until a recent date no genuine quartz leads had been discovered in the Hills, but there was a great abundance of the cement, such as is found at the Keets, Hidden Treasure, Amara, etc., and which was designated and generally accepted as quartz, simply because it made no difference what the geological formation was so long as it produced gold, which it did most generously. This cement is a water formation, consisting of clay, gravel, disintegrated quartz and gold, resting upon bedrock, not extending into or below it. The pay streak—as in placer diggings—varies in depth and direction, and is often broken, thus rendering the mine spotted, and largely worthless, but the "pockets" wherein the metal is found are invariably very rich, and more than compensate for working the barren patches. The ore, quartz, or whatever it may be called, is worked the same as genuine granite ore. It is blasted out, crushed by stamp mills, amalgamated and duly retorted, and produces an average of $12 per ton. The cost of mining and milling (with a convenient mill site) is $4 per ton; leaving a profit of $8 per ton, and as each stamp is capable of crushing one and a half tons per day, a 20-stamp mill will turn in to its owners the daily revenue of $240. These cement beds abound principally around Deadwood and Lead City; but recent discoveries at Rockerville, 45 miles southeast, prove conclusively that a stratum may be found anywhere along the belt.

### HILL DIGGINGS.

Hill diggings are also found all along the mineral line, and all are very rich; but heretofore a great drawback has been experienced from a lack of water. Claims upon Rapid were successfully worked last year by packing the gravel into sacks and carrying it, in many instances a mile, to water, where it was sluiced or rocked out. Great improvements are being made in the introduction of ditches, which, starting at a distance often of many miles, secure fall sufficient to reach the highest mountains. By this process a large amount of ground will be worked the coming season.

### QUARTZ MINING ENTERPRISES.

Until lately it was an open question whether the Hills contained any true fissure veins of value, or whether it could be called a quartz country. That question is at last decided, and most emphatically, in the affirmative. I was recently a witness to the sale of the De Smett, Justice and Belcher lodes for the handsome figure of $400,000. Ten months

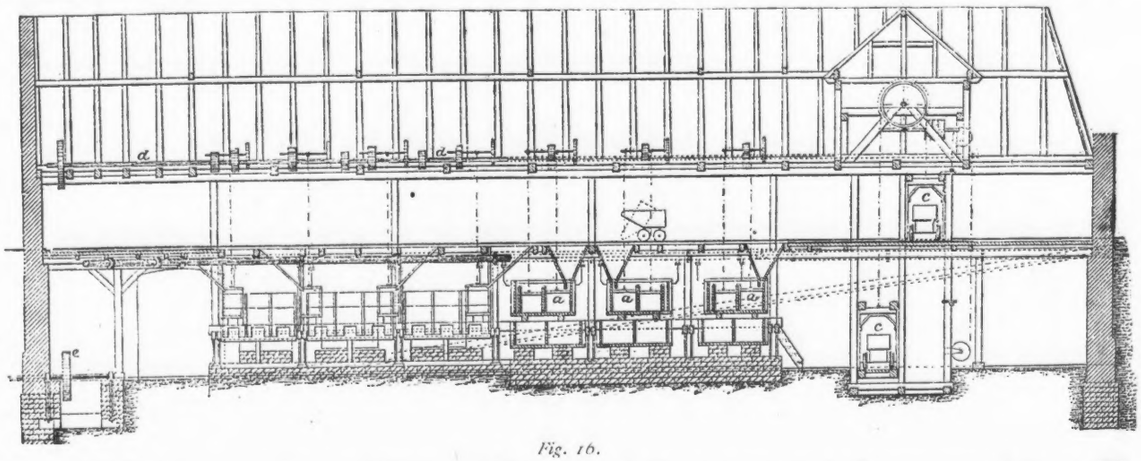


Fig. 16.

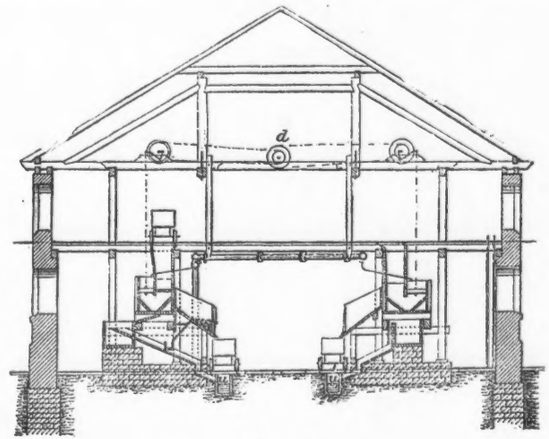


Fig. 18.

Section of Fig. 16.

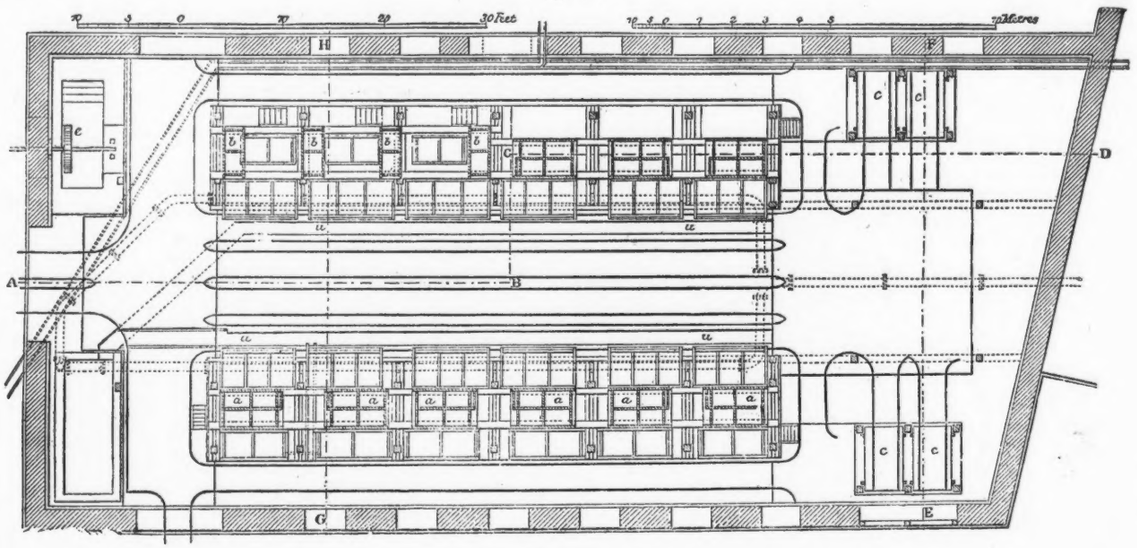


Fig. 17.

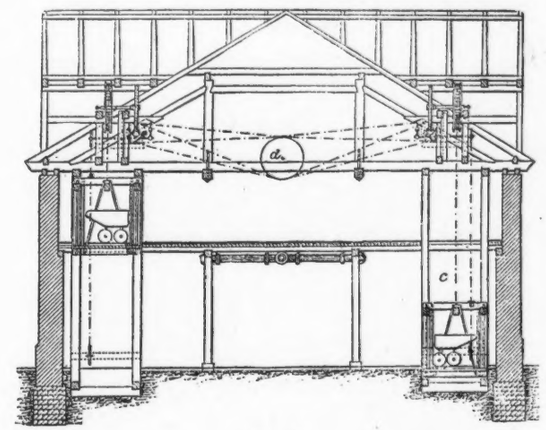


Fig. 19.

Section of Fig. 17.

REGISTER.

*Figs. 16, 17, 18, 19 - Coarse Jigging House.*

# THE NEW DRESSING WORKS AT CLAUSTHAL.—No. V.

ago one of the mines was sold for $400, but then the property was undeveloped, and dear at the price paid. During the summer Coll Deane, representing California capitalists, came into the country, and, looking about him, cast upon the property named. Since that time over $30,000 have been spent prospecting, and with such favorable results that the immense sum was paid as stated for the ground. The Homestake Company, consisting of Lloyd Tenis (President of Wells, Fargo & Co.), Mark L. McDonald, Henry Janin, G. L. Dodge, George Hearst, J. B. Haggin and D. F. Derdenelle, and the De Smett Company, composed of Mr. Ferrish, Archie Borland, A. Henne and Coll Deane, all California capitalists, have invested in the last six months over $750,000 in property in the Hills. Among their schemes is one for the construction of a ditch, to extend from Spearfish, fifteen miles distant, to Deadwood, which it will supply with water, as well as furnish an abundance for mill purposes, and also be utilized in floating wood and timbers to the several mines and mills. This work will be completed by September at an expense of $130,000.

COMPARISONS.

The stability of a mining country is established solely by its quartz interests, and as I have predicted that the Hills will prove the richest mineral land in America a comparative review may be eminently practical.

The three last clean-ups of the De Smett mill showed an average of $15.65 per ton, and no rock has yet been seen that failed to produce over $12 per ton. I have cited these mines only as illustrations. There are the Roderick Dhu, Golden Gate, North Star, Terra, and hundreds of others equally as good, although not so fully developed. With such facts established can you, reader, doubt that we have in the Hills a very rich country?

The social atmosphere of Deadwood and suburban camps has experienced a great change during the last six months. Deadwood is not the town of a year ago. Its gambling hells, dance halls, houses of ill fame and disorderly characters have dwindled in numbers, and their business has decreased so greatly that a comparison with a town in the interior of the Empire State would not be *mal apropos*. If there has been a period in the history of the people when a revolver was considered a necessary article of personal appendage, or that the necessity for its use was likely to arise at any moment, that time has passed, and now a person may walk the streets of Deadwood at any hour of the day or night and enjoy as great immunity from molestation as though perambulating the streets of New York. Society is large and highly respectable. Merchants, professional men and miners have brought out their families, until now the exceptional man is he who is here alone. Churches have sprung into existence in every camp in the Hills—Deadwood having two—and services are largely attended. School-houses have been erected and are well supplied with tutors. Two daily papers and five weeklies publish the news from all parts of the world as brought in by the telegraph, and the sheets will favorably compare with any published elsewhere in cities of equal size to Deadwood. Three daily stage lines afford ample means of egress, and bring us mails only four days from Chicago. Well organized fire and police departments, very efficient county and United States courts, as well as a full complement of efficient county officers are among the other beneficent provisions of the people.

## INDEX OF CURRENT TECHNICAL LITERATURE.

EXCHANGES.

[In this department will be given abstracts of the more important original articles co n tained in current technical periodicals at home and abroad.]

The following gentlemen have kindly consented to assist in making the reviews of current technical periodicals:

JOHN C. RANDOLPH, Mining Engineer, New York.
Prof. TROWBRIDGE, School of Mines, Columbia College, New York.
Prof. H. S. MONROE, " " " " "
Prof. T. EGLESTON, " " " " "
ARTHUR F. WENDT, Mining Engineer, New York.
MANSFIELD MERRIMAN, Yale Scientific School, New Haven, Conn.
FRANKLIN GUITERMAN, Mining Engineer, Cincinnati, Ohio.
Prof. P. deP. RICKETTS, Ph. D., School of Mines, New York.
Prof. E. A. FUERTES, Cornell University, Ithaca, New York.

ZEITSCHRIFT DES BERG UND HUTTENMANNISCHEN VEREINES FUR STEIERMARK UND KARNTEN.—Vienna, January, 1878.—*The Hamvir Process*, by P. Tunner. (A memorandum on Mr. Deby's papers in the Iron and Steel Institute of London last March. The process consists, as is known, of passing hot blast through fluid pig metal from the blast furnace. The following analyses of Prof. Joly, of Brussels, are quoted:

| | Before blowing through. | After blowing through. |
|---|---|---|
| Sulphur | 0·037 | 0·024 |
| Phosphorus | 1·710 | 1·440 |
| Silicium | 1·160 | 0·690 |
| Carbon | 4·100 | 2·800 |

Some memoranda are also given as to the charges for eighteen months at the Manbenge furnace, where it was tried.).....*Boring with free Falling Drill and with the Diamond Drill Compared*, by Leo Strippelmann. (The author commences in this number a comparison of these two methods of deep boring, beginning with a detailed account of two deep holes bored by the two methods. That by the first was sunk for coal in Bohemia, at Malkowitz, and that by the second, also for coal, at Weyherfeld in Switzerland. The present number deals with the hole at Malkowitz, and gives in detail the contract made, etc. As the article advances, if it is of the careful nature seemingly indicated, careful condensations of it will be given in this column.).....*Relation Between the Hardness and Composition of Iron*, by Anton von Kerpely ....*Iron and Phosphorus*. (A discussion of recent papers by Siemens, Bell and Wedding on this subject. J. C. R.

BERG UND HUTTENMANNISCHE ZEITUNG.—Leipsig, January 18, 1878.—*Blast-Furnace Notes in England in* 1875, by L. Pellatun. ..*On the Use of Compressed Air in the Technical Arts*, by J. E. Cederblom. (A mathematical discussion comparing steam and compressed air—to be continued.)....*Electro-Chemical Determination of Manganese, Nickel, Zinc and Lead*, by Alfred Riche. (Manganese alone is precipitated in a platinum crucible, using one or two Bunsen cups. The operation is carried on at a waterbath temperature of 70°—90° C., the solution being a nitrate or sulphate, and the precipitate being binoxide, which is washed, dried, incinerated and weighed. This determination cannot be made in presence of iron, which must first be precipitated by carbonate of baryta. For nickel, an ammoniacal solution is used.).....*A Traveling Blow-Pipe Lamp*, by C. Le Neve Foster. (Filled with wax instead of oil.) J. C. R.

January 25, 1878.—*Furnace Notes in England in* 1875, by L. Pellatun. (Continuation The works at Huliside and Landore.)

February 1, 1878.—*Proceedings of the Mining Verein, at Freiberg*.....*Notes on Greek Ores*, by X. Landerer.....*New Rapid Method for Determining Nickel*, by Margaret S. Cheney and Ellen Richards.

February 8, 1878.—*Proceedings of the Mining Verein at Freiberg*.. ...*Notes on Mining and Metallurgical Matters*. J. C. R.

## ASSAY DEPARTMENT OF THE ENGINEERING AND MINING JOURNAL.

This department is opened for the benefit of miners, prospectors, and others in terested in minerals.

Replies will be made in these columns, and *without charge*, to questions asked regarding the nature and commercial value of minerals, and of samples sent.

Assays determining the actual composition and value of ores will be made at the following rates. All assays are made with the utmost care by the most experienced and competent assayers:

| | | | |
|---|---|---|---|
| Assay for Gold | $2 00 | Assay for Lead | $1 50 |
| " Silver | 1 50 | " Zinc | 3 00 |
| " Gold and silver | 2 00 | Zinc Analyses | 5 00 |
| " Copper | 2 00 | | |

*The amount should invariably accompany the order, and expressage or postage must always be prepaid.*

Communications, samples, etc., to be addressed to

Western Office,
ENGINEERING AND MINING JOURNAL,
Denver, Colorado.

OR

ENGINEERING AND MINING JOURNAL,
(P. O. Box 4404, 27 Park Place, New York.

## ANSWERS.

ASSAYS.

*New York Office:* CXII. John C. Porter, St. Louis, Mo.—Specimen yielded only traces of gold.

CXIII. L. H., New York.—Sample quartz; gold a trace; no silver.

CXV. D. M. Easton, South Fork, Lincoln County, N. M.—No. 1, Copper pyrites, rich; No. 2, Chloritic rock; apparently contains no useful mineral.

CXVIII. Warthorst & Brown, Massillon, O.—The samples of red shales are not of sufficient uniformity of composition, or sufficiently free from grit to make a good paint, though beds of a similar character. near Wilkes-Barre, Pa., make a good and salable article of paint.

## STATISTICS OF COAL PRODUCTION.

*This is the only Report Published that gives full and accurate returns of the production of our Anthracite mines.*

Comparative statement for the week ending March 2, and years from Jan. 1:

| TONS OF 2,240 LB. | 1878. | | 1877. | |
|---|---|---|---|---|
| | Week. | Year. | Week. | Year. |
| *Wyoming Region.* | | | | |
| D. & H. Canal Co.. | 49,250 | 450,135 | 38,821 | 319,423 |
| D. L. & W. RR. Co. | 36,998 | 331,831 | 32,143 | 318,264 |
| Penn. Coal Co..... | 292 | 87,719 | 13,798 | 128,501 |
| L. V. RR. Co..... | ..... | 128,330 | 11,854 | 154,932 |
| P. & N. Y. RR. Co.. | ..... | 1,738 | 1,473 | 7,145 |
| C. RR. of N. J..... | 31,368 | 129,405 | 19,510 | 166,551 |
| | 117,908 | 1,129,158 | 117,599 | 1,094,816 |
| *Lehigh Region.* | | | | |
| L. V. RR. Co..... | ..... | 306,499 | 42,236 | 374,813 |
| C. RR. of N. J..... | 16,068 | 135,472 | 19,573 | 143,943 |
| D. H. & W. B. RR.. | 25 | 3,329 | 313 | 4,022 |
| | 16,093 | 445,300 | 62,122 | 522,778 |
| *Schuylkill Region.* | | | | |
| P. & R. RR. Co..... | 70,230 | 386,654 | 68,847 | 599,180 |
| Shamokin & Lykens Val..... | 7,744 | 59,699 | 6,578 | 57,877 |
| | 77,974 | 446,353 | 75,425 | 657,057 |
| *Sullivan Region.* | | | | |
| Sul. & Erie RR. Co. | ..... | 5,635 | 70 | 2,054 |
| Total..... | 211,975 | 2,026,446 | 255,216 | 2,276,805 |
| Increase..... | ..... | ..... | ..... | ..... |
| Decrease..... | 43,241 | 250,359 | ..... | ..... |

The above table does not include the amount of coal consumed and sold at the mines, which is about five per cent. of the whole production.

*Receipts and shipments of coal at Chicago Ill.*, for the two weeks ending March 2, and year from Jan. 1.

| | Week. Tons. | Year. Tons. |
|---|---|---|
| Receipts | 39,823 | 165,932 |
| Shipments | 6,314 | 37,054 |
| *Perth Amboy business:* | | Tons. |
| Received for the week | | 750 |
| Shipped for the week | | 9,331 |
| On hand March 2 | | 94,486 |

*The Exports of Coal from Baltimore* for the week ending March 1 were 1,350 tons, and since January 1, 10,014 tons as against 3,757 tons for the corresponding time in 1876.

*Coal Creek Mines, Colorado.*—Shipments for week ending February 9, 1,852 tons.

*Receipts of Coal at Boston*, for the week ending March 1 and years from Jan. 1:

| TONS OF 2,240 LB. | 1878. | | 1877. | |
|---|---|---|---|---|
| | Week. | Year. | Week. | Year. |
| From | | | | |
| Alexandria and Georgetown | ..... | 1,749 | 478 | 478 |
| Philadelphia | 5,920 | 52,591 | 6,750 | 36,065 |
| Baltimore | 490 | 9,472 | 5,360 | 11,450 |
| Other places | 2,140 | 39,659 | 2,160 | 31,512 |
| Great Britain | ..... | 5,753 | ..... | 707 |
| Nova Scotia | ..... | 321 | ..... | ..... |
| Total | 8,550 | 109,545 | 14,748 | 80,212 |

*Belvidere Delaware Railroad Report for week ending March 2:*

| | Week. | Year. 1878. | Year. 1877. |
|---|---|---|---|
| Coal for shipment at Coal Port (Trenton) | ..... | ..... | ..... |
| Coal for shipment at South Amboy | 4,411 | 102,065 | 80,168 |
| Coal for distribution | 2,678 | 26,746 | 28,721 |
| Coal for Company's use | 697 | 14,246 | 13,100 |

**The Production of Bituminous Coal** for the week ending March 2, was as follows:

Tons of 2,000 lbs., unless otherwise designated.

| | Week. Tons. | Year. Tons. |
|---|---|---|
| *Cumberland Region, Md.* | | |
| Tons of 2,240 lb | 6,403 | 106,630 |
| *Barclay Region, Pa.* | | |
| Barclay R. R., tons of 2,240 lbs | ..... | 47,654 |
| *Broad Top Region, Pa.* | | |
| Huntingdon and Broad Top R. R | 2,090 | 22,467 |
| *East Broad Top | 1,204 | 11,225 |
| *Clearfield Region, Pa.* | | |
| *Snow Shoe | 1,000 | 5,820 |
| *Tyrone and Clearfield | 24,180 | 144,496 |
| *Allegheny Region, Pa.* | | |
| *Pennsylvania R. R | 3,826 | 27,086 |
| *Pittsburgh Region, Pa.* | | |
| *West Penn. R. R | 4,548 | 10,041 |
| *Southwest Penn. R. R | 510 | 4,744 |
| *Penn & Westmoreland gas coal, Pa. R. R | 13,734 | 114,550 |
| *Pennsylvania R. R | 7,193 | 51,660 |

*For the week ending Feb. 21.

**The Production of Coke** for the week ending Feb. 21:

| Tons of 2,000 lbs. | Week. | Year |
|---|---|---|
| West Penn. R. R | 1,438 | 8,210 |
| Southwest Penn. R. R | 13,305 | 103,636 |
| Penn. & Westmoreland Region, Pa. R. R. | 1,028 | 8,683 |
| Pittsburg, Penn. R. R | 1,049 | 11,101 |
| Total | 16,820 | 131,630 |

## COAL TRADE REVIEW.

NEW YORK, Friday Evening, March 8, 1878.

### Anthracite.

The business in anthracite coal shows no change. It is about as small as it could be, with no indication of an important early revival. The causes of this stagnation are the unprecedentedly mild winter we have had, which has greatly reduced the consumption of coal, and a lack of confidence among buyers in the stability of the combination, which results in their consuming coal in stock before making further purchases. As there was a great deal of coal bought last year because it was cheap, buyers would not necessarily have to enter the market early this year, even were general business in a much better condition than it is, and had the winter been an average severe one. With all these causes at work, we do not see how an active demand can set in during the first half of this year.

Prices show no improvement as compared with several weeks past, while the coal "on the market" is fully as great, if not greater than heretofore. If the companies would advance prices they must keep their coal at the mines until it is wanted, and not bring it here in such quantities that it must be put into boats. They may agree among themselves as much as they please not to sell coal at less than a fixed quotation,

but when it has to pay demurrage the best of them are likely to fall. This is the present trouble, and we see no immediate signs of relief. An advance of circular rates on the 1st prox. is still talked of, but, unless some improvement sets in this will be but a mere farce, as there is but a very insignificant quantity of coal being sold at those rates now, the majority of business doing being at prices considerably under them.

The production last week was but 211,975 tons, as compared with 252,077 the previous week, and 255,216 tons the corresponding week of 1877. The total production from January 1 is 2,026,446 tons as against 2,276,805 tons for the like period of last year, showing a loss of 250,359 tons this year.

THE PHILADELPHIA & READING COAL AND IRON COMPANY.

OFFICE No. 227 SOUTH FOURTH STREET,
PHILADELPHIA, March 1, 1878.

The position of General Sales Agent is hereby discontinued, and Mr. E. A. Quintard is appointed European Sales Agent, the locality of his office to be hereafter designated.

Mr. J. B. McCamant is appointed a local sales agent of the company, with his office in Providence, R. I.

Mr. T. Guilford Smith is appointed Local Sales Agent for the Western and Lake trade, with his office in Buffalo, N. Y.

The Eastern, Western and New York local sales agents will report directly to Mr. Thomas M. Richards, the General Coal Agent, who will regulate the boundaries of their districts, and have general supervision and control of their sales.

All sales in the Southern States, Pennsylvania, Delaware, and that part of New Jersey including and lying south of Mercer and Ocean counties, will be under the charge and control of Mr. Samuel C. Harris, who will be known as the Line and Southern Sales Agent.

No credit will be given to any purchaser unless recommended by the Treasurer of the company, and approved by the Board of Directors.

FRANKLIN B. GOWEN, President.

CIRCULAR NO. 4—PHILADELPHIA & READING RAILROAD COMPANY.

PHILADELPHIA, March 1, 1878.

The yearly allotment of wharves at Port Richmond will be made during the month of March, and the spring rates of freight and tolls will be issued about the 25th inst., to take effect on April 1.

Meantime, and until further notice, on all shipments of anthracite coal from Port Richmond during the month of March, consigned to points east of New Brunswick, a drawback of fifteen (15) cents per ton on stove coal and twenty (20) cents per ton on all other sizes will be allowed.

FRANKLIN B. GOWEN, President.

## Bituminous.

No important business is being done in this coal, nor is there likely to be until the Baltimore & Ohio and Pennsylvania Railroads determine upon their tolls, which, it is said, will be advanced. This is, however, quite uncertain, and is probably based upon the belief that the price of anthracite coal will steadily increase. The labor question is practically unchanged in the Cumberland region, although there are indications that the companies are steadily gaining ground; yet it is not at all certain that the contest will be speedily ended.

### New York.

***Wholesale Prices of Anthracite Coal f. o. b. at Tide Water Shipping Ports, per ton of 2,240 lbs.***

| | Lump. | Steamer. | Grate. | Egg. | Stove. | Chestnut. |
|---|---|---|---|---|---|---|
| WYOMING COAL. | | | | | | |
| Lackawana, at Weehawken | $3 25 | $3 25 | $3 25 | $3 35 | $3 75 | $3 50 |
| *Pittston, at Weehawken | 3 25 | 3 25 | 3 25 | 3 35 | 3 75 | 3 50 |
| Wilkesbarre, at Port Johnson | 3 25 | 3 25 | 3 25 | 3 35 | 3 75 | 3 25 |
| Lehigh Valley Coal Co., at Amboy | ..... | 3 50 | 3 25 | 3 35 | 3 75 | ..... |
| Plymouth R. A., at Port Johnston | ..... | ..... | 3 25 | 3 45 | 3 85 | 3 35 |
| LEHIGH COAL. | | | | | | |
| Old Company's, at Port Johnston | 3 75 | ..... | 3 40 | 3 50 | 3 75 | 3 25 |
| Honey Brook Lehigh, at Port Johnston | 3 75 | ..... | 3 40 | 3 50 | 3 75 | 3 25 |
| Lehigh Valley Coal Co., at P. Amboy | 3 75 | ..... | 3 50 | 3 50 | 3 75 | 3 25 |
| Mount Pleasant, at Hoboken | 3 50 | ..... | 3 50 | 3 50 | 3 75 | 3 00 |
| Hazelton, at Hoboken | 3 50 | ..... | 3 50 | 3 50 | 3 75 | 3 00 |
| Cross Creek, at Port Johnston | 3 50 | 3 40 | 3 40 | 3 50 | 3 75 | 3 25 |
| SCHUYLKILL COAL *at Pt Johnston, Phila.* | | | | | | |
| Hard White Ash | 3 25 | 3 25 | 3 25 | 3 25 | 3 50 | 3 00 |
| Free-burning W. Ash | ..... | 3 25 | 3 25 | 3 25 | 3 50 | 3 00 |
| Schuylkill Red Ash | ..... | ..... | ..... | 3 50 | 3 50 | 3 00 |
| Lorberry | ..... | ..... | 3 60 | 3 60 | 3 60 | 3 00 |
| Lykens Valley Vein | ..... | ..... | 3 75 | 3 75 | 3 75 | 3 25 |

* Forty cents per ton additional for delivery in New York.

***Wholesale Prices of Bituminous Coal.***

DOMESTIC GAS COALS.

| Per ton of 2240 lb. | At the Shipping Ports. | Alongside in New York. |
|---|---|---|
| Westmoreland and Pennsylvania— | | |
| At Greenwich, Philadelphia | $4 70 | $5 50 |
| At S. Amboy | 5 00 | 5 50 |
| Kanawha at Richmond | 4 10 | 5 40 |
| Red Bank Cannel, Pa., at Philadelphia | 8 00 | 8 50 |
| Youghiogheny, Waverly Co., at Balt | 4 50 | 5 65 |
| Despard, West Va | 4 50 | 6 00 |
| Murphy Run, West Va., at Baltimore | 4 50 | 5 85 |
| Fairmount, West Va., " " | 4 40 | 5 70 |
| Newburg Orrel. Md. " " | 4 50 | 6 00 |
| Cannelton Cannel, West Va | | 10 00 |
| " Splint " at Richmond | 6 00 | 7 00 |
| " Gas Coal at Richmond | 4 00 | 5 65 |
| Peytona Cannel, W. Va., at Richmond | | 10 00 |

MANUFACTURING AND STEAM COALS.

| | | |
|---|---|---|
| Cumberland at Georgetown and Alexandria | 2 85@3 10 | 4 35@4 50 |
| Cumberland, at Baltimore | 3 10@2 25 | 4 35@4 50 |
| Cl'rfi'd "Eureka" and "Franklin." | | |
| At mines | 0 75 | .... |
| At Baltimore | 3 25 | 4 50 |
| At Philadelphia | 3 25 | 4 50 |

FOREIGN GAS COALS.

| | Sterling. | Am. cur'ncy. |
|---|---|---|
| Newcastle, at Newcastle-on Tyne | 8s.6d.@10s.6d. | $5 50@ $6 00 |
| Liv. House Orrel, at Liv. | 25s. | 13 00 |
| Ince Hall Cannell " | 35s.6d. | 18 00 |
| " Gas Cannel " | 25s.6d. | 10 00@ 10 50 |
| Scotch Gas Cannel, at Glasgow, nominal | 25s. | 7 50 |
| | Gold. | |
| Bl'k House, at Cow Bay, N.S. | $1 75 | $4 50 |
| Caledonia, at Pt. Caledonia | 1 50 | 4 25 |
| Glace Bay at Glace Bay | 1 60 | 4 25 |
| Lingan, at Lingan Bay | 1 75 | .... |
| Intern'l Mines, at Sydney | 1 75 | 4 50 |
| Pictou, Vale Mines, at Pictou | 2 00 | 4 70 |

***Retail Prices.***

Per ton of 2,000 lb,

*Anthracite.*

| | G. & Egg. | Stove. | Chest. |
|---|---|---|---|
| Pittston coal delivered | $5 00 | $5 00 | $5 00 |
| Lack. coal, delivered below 59th St. | 4 50 | 4 50 | 4 50 |
| Wilkes-Barre, delivered above Canal Street | 4 50 | 4 75 | 4 50 |
| Wilkes-Barre, deliv'd below Canal Street | 4 25 | 4 50 | 4 25 |
| Lehigh and Locust Mountain, delivered above Canal Street | 5 00 | 5 00 | 4 75 |
| Lehigh and Locust Mountain, delivered below Canal Street | 4 50 | 4 75 | 4 50 |

*Bituminous.*

| | | | |
|---|---|---|---|
| Liv. House Orrel | $18 00 | American Orrel | $11 00 |
| Liv. House Cannel | 18 00 | Red Bank Cannel | 7 00 |
| Am. " | 11 00 | Cumberland | 9 00 |
| Ca'n'lt'n Bl'k, or splint. | 10 00 | | |

### Baltimore. March 4, 1878.

Specially reported.

*Wholesale Prices per ton of 2,240 lb.*

*In cars at Depot N. C. R. R.*

HARD WHITE ASH, FREE-BURNING WHITE ASH, SHAMOKIN, ETC.

| | | | |
|---|---|---|---|
| Lump and Steamboat | $4 15 | Stove | $4 50 |
| Broken | 4 20 | Chestnut | 4 00 |
| Egg | 4 30 | | |

LYKENS VALLEY RED ASH.

| | | | |
|---|---|---|---|
| Broken, Egg and Stove | $4 55 | Chestnut | $4 15 |

From yard or wharf to dealers, 75c. per ton additional for all kinds and sizes.

| | | | |
|---|---|---|---|
| Anthracite, broken | $4 55 | Caledonia | $4 50 |
| " egg | 4 55 | Cannel, English | 18 00 |
| " stove | 5 05 | " Library | 15 00 |
| Franklin | 5 75 | " Buckeye | 11 00 |
| Cumberland | 4 90@5 00 | Penn | 6 25 |
| Clearfield | 4 75@4 90 | Youghiogheny | 6 25 |
| Westmoreland | 6 25 | | |

[*Commercial Bulletin.*

### Buffalo, N.Y. March 5, 1878.

[Specially reported by C. M. UNDERHILL.]

The Delaware, Lackawanna & Western Railroad Co. will sell their Scranton coal, the Delaware & Hudson Canal Co. will sell their Lackawanna coal, and J. Langdon & Co. will sell their Henry Clay and Mount Carmel Black Diamond coals, at the following prices per ton of 2,000 lb. for Buffalo local trade for the present:

| | To DEALERS. | | To CONSUMERS. |
|---|---|---|---|
| | On car or boat. | In yard, screened. | Delivered at yard. Retail. |
| Grate | $4 20 | $4 30 | $5 45 |
| Egg | 4 20 | 4 30 | 5 45 |
| Stove | 4 45 | 4 55 | 5 70 |
| Chestnut | 4 35 | 4 45 | 5 60 |
| Blossburg | 3 85 | 4 35 | 5 00 |

[Specially reported by LEE & LOOMIS.]

*Per ton of 2,000 lb. delivered on cars.*

| | Lump. | Run of Mine. | Nut. | Slack. |
|---|---|---|---|---|
| Connellsville coke | $4 75 | ..... | ..... | ..... |
| Brookfield Coal | 3 65 | ..... | ..... | ..... |
| Brier Hill | 3 25 | ..... | ..... | ..... |
| Youghiogheny | 4 00 | ..... | ..... | ..... |
| Monterey | ..... | 2 85 | ..... | ..... |
| Catfish | ..... | 2 85 | ..... | 1 90 |
| Stoneboro' | ..... | ..... | 2 50 | 1 90 |
| Sterling Cannel | 5 00 | ..... | ..... | ..... |

### Cincinnati, O. Feb. 27, 1878.

[Specially reported by the Consolidated Coal & Mining Co.]

*Per bushel of 72 lbs.*

| | Retail delivered. | Wholesale afloat. |
|---|---|---|
| Youghiogheny | 11c. | 7½c. |
| Camden | 9c. | 5½c. |
| Cannel | 17@18c. | 13c. |

Anthracite, delivered, $7@$8 per ton of 2,000 lbs.

### Chicago, Ill. March 5, 1878.

[Specially reported by Messrs. RENO & LITTLE.]

*Retail prices of coal delivered per ton of 2,000 lb.*

| | | | |
|---|---|---|---|
| Lakawanna Stove | $6 75 | Erie and Brier Hill | $5 50 |
| " Chestnut | 6 75 | Wilm'gton & Ill. | $3 50@4 00 |
| " Grate | 6 75 | Blossburg | 6 50 |
| " Egg | 6 50 | Piedmont | 7 50 |

### Hamilton, Ont. March 5, 1878.

[Specially reported by H. BARNARD.]

*Retail prices delivered per ton of 2,000 lb.*

| | | | |
|---|---|---|---|
| Scr. or Wilkes-B. Grate | $5 00 | Lehigh Lump | $6 00 |
| " " Egg | 5 00 | Brier Hill | 5 50 |
| " " Stove | 5 25 | Massillon | 4 50 |
| " " Nut | 5 25 | Smithing | 5 50 |

### Louisville, Ky. March 5, 1878.

[Specially reported by Messrs. BYRNES & SPEED.]

*Wholesale per bushel of 72 lb.*

| | | | |
|---|---|---|---|
| Pittsburg | 8c. | Raymond City | 7½c. |
| Ashland (Ky.) | 7 | Kentucky, on cars | 8 |

*Retail.*

| | | | |
|---|---|---|---|
| Pittsburg | $3 00 | Anthracite, per ton | $7 50 |
| Raymond City | 2 75 | City Made Coke, per bsh | 7c. |
| Ashland (Ky.) | 2 50 | Soft Coke, per bushel | 7c. |
| Pittsburg nut | 2 50 | | |

### Montreal. March 5, 1878.

[Specially reported by Messrs. ROBERT C. ADAMS & Co.]

*Wholesale per 2,240 lb.*

| | | | |
|---|---|---|---|
| Scotch Steam | $4 75 | Cape Breton Steam | $4 25 |
| Pictou | 4 50 | Newcastle Smith's | 6 00 |

*Anthracite at retail, per 2,000 lb. delivered.*

| | | | |
|---|---|---|---|
| Stove | $6 50 | Chestnut | $6 00 |
| Egg | 6 00 | | |

### Milwaukee, Wis. March 5, 1878.

[Specially reported by Messrs. R. P. ELMORE & Co.]

*Retail price per ton of 2,000 lb.*

| | | | |
|---|---|---|---|
| Anthracite, Egg, Chestnut and Stove | | | $6 50 |
| Lehigh lump | $7 00 | Connellsville coke on | |
| Brier Hill | 5 25 | RR. track | 7 25 |
| | | Straitsville | 4 80 |

### New Orleans, La. March 1, 1878.

[Specially reported by Messrs. C. A. MILTENBERGER & Co.]

Since our last report the runners of Pittsburg coal have effected a combination, establishing a uniform price for coal at wholesale. We now quote:

Coal on hand March 1: Pittsburg coal, 153 boats, 3 barges and 2 French creeks; St. Bernard coal, 2 boats and 1 barge. Consumption during February: Pittsburg coal, 40 boats and 10 barges; St. Bernard coal, 1 boat. Arrivals during February: Pittsburgh coal, 98 boats, 7 barges and 2 French creeks; St. Bernard coal, 3 boats and 1 barge. Ten boats Pittsburg coal, sunk during the storm of February 20, are included in the above consumption.

PITTSBURG COAL.

| | | | |
|---|---|---|---|
| At wholesale (by boat-load) | 32½@35c. per bbl. of 180 lb. | | |
| To steamboats | 50c. | " | " |
| " manufactories | 50c. | " | " |
| " families | 60c. | " | " |

In hhds. (for shipment) $6.00 per hhd. from 5 to 6 bbls.

ANTHRACITE COAL

*Per ton of 2,000 lb.*

| | |
|---|---|
| At wholesale | $7 00 to $8 00 |
| To families, etc. | 9 00 to 10 00 |

ST. BERNARD (KY.) COAL.

| | | | |
|---|---|---|---|
| To steamboats | 40c. per bbl. of 180 lb. | | |
| " families | 50c. | " | " |
| Virginia cannel to families | $1.00 | " | " |

### Philadelphia, Pa., March 7, 1878.

[Specially reported.]

There is no new feature in the coal trade, which remains utterly prostrated, owing to the very mild weather and the over-supply forced on the market. The supposed curtailment is only a myth. The Board of Control have regulated the amount to be produced on theoretical expectations, and neglected entirely the reality.

Working two weeks out of four, and doing fully as much during these two weeks as was produced in four weeks at this season of the year, and when no curtailment was attempted, ends in no curtailment at all. If the trade is to be benefited by regulating the supply according to the demand, it ought to be done fairly and squarely, and not trifled with. The year will hardly be long enough, at the rate the reduction has so far been made, to accomplish any good.

Freights continue on the decline, and vessels are reported chartered for Boston at $1.

We are in the midst of a thunder storm, and ice is more needed than coal.

### Pittston, Pa. March 5, 1878.

Pennsylvania Coal Company's Coal in Yard.

*Retail per ton of 2,000 lb.*

| | |
|---|---|
| Lump, Egg, and Stove | $2 25 |
| Chestnut | 2 00 |
| Pea | 1 00 |

Delivered, 50 cents per ton additional.

### Richmond, Va. March 5, 1878.

[Specially reported by S. H. HAWES, Dealer in Coal.]

*Per ton of 2,240 lb. f.o.b.*

| | | | |
|---|---|---|---|
| Kanawha Cannel | $9 00 | New River Bituminous | $3 70 |
| Coalburg Splint | 5 70 | Clover Hill Coal | 3 00 |
| Lewiston | 5 70 | Norwood Gas and | |
| Kanawha Gas Coal | 4 90 | Steam Coal | 2 70 |

### St. Louis, Mo. March 5, 1878.

[Reported by JAMES J. SYLVESTER, Secretary of the Anthracite Coal Association.]

*Retail prices, delivered. Ton of 2,000 lb.*

ANTHRACITE.

| | Per ton. | | Per ton. |
|---|---|---|---|
| Lackawanna | $8 00@8 50 | Schuylkill | $8 00@8 50 |
| Wilkes-Barre | 8 00@8 50 | Lehigh | 9 00@9 50 |

BITUMINOUS.

| | | | |
|---|---|---|---|
| Blossburg | $9 00 | Big Muddy | $3 00 |
| Pittsburg | 4 50 | Illinois Coals | 2 50@3 00 |
| Indiana Block | 4 00 | Connells. Coke | 6 50 |

**Sandusky, Ohio.** March 5, 1878.

[Specially reported by C. E. BLACK, Agent Con. Coal and Mining Company.]

We quote coal on cars at Sandusky, as follows:

*Per ton of* 2,000 *lb.*

ANTHRACITE.

| | Grate. | Egg. | Stove. | Chest. |
|---|---|---|---|---|
| Lehigh | $6 50 | $6 50 | $6 50 | $6 50 |
| Wilkes-Barre | 5 75 | 5 75 | 5 75 | 5 75 |
| Lackawanna | 5 75 | 5 75 | 5 75 | 5 75 |

BITUMINOUS.

| | | | |
|---|---|---|---|
| Massillon | $3 00 | Straitsville | $2 70 |
| Del Carbo | 2 75 | Shawnee | 2 70 |
| Hocking Valley | 2 70 | Blossburg | 4 75 |

Prices retailed delivered 50c.@75c. above car prices.

**Toledo, Ohio.** Feb. 28, 1878.

[Specially reported by Messrs. GOSLINE & BARBOUR.]

The coal trade in Toledo for the past winter has been as light as at other places, owing to the extremely mild winter. The anthracite stock will be sufficient to supply the demand until navigation opens, which now, by the way, promises earlier than common. Comparatively little anthracite has been brought here by rail during the winter months, as the stocks shipped by lake have proved sufficient. The receipts of soft coal are on the increase.

We report prices of coal on cars at Toledo as follows:

*Ton of* 2,000 *lb.*

| | | | |
|---|---|---|---|
| Straitsville lump | $2 65 | Massillon lump | 2 85 |
| " nut | 2 20 | " nut | 2 40 |
| Shawnee lump | 2 65 | Willow Bank lump | 2 85 |
| " nut | 2 20 | " nut | 2 40 |
| Hocking Valley lump | 2 65 | Cumberland | 5 40 |
| " nut | 2 20 | Blossburg | 5 40 |

Prices of hard coals on cars at Toledo are as follows:

*Ton of* 2,000 lb.

| | Grate. | Egg. | Chestnut. | Stove |
|---|---|---|---|---|
| Pittston | $5 70 | $5 70 | $5 85 | $5 95 |
| Wilkes-Barre | 5 70 | 5 70 | 5 85 | 5 95 |
| Lackawanna | 5 70 | 5 70 | 5 85 | 5 95 |
| Lehigh | 5 75 | 6 15 | 6 30 | 6 40 |

For retail delivery in city the prices are as follows: Stove and chestnut $6.45; grate and egg, $6.20 per ton; Lehigh 60c. per ton additional.

Prices soft coal f.o.b. vessel for Lake shipments will be from 15 to 20c. per ton more than prices on cars.

**Freights.**

*Per ton of* 2,240 *lb.*

Representing the latest actual charters to March 7, 1878.

| PORTS. | From Philadelphia. | From Baltimore. | From Elizabethport, Port Johnson, South Amboy, Hoboken and Weehawken. |
|---|---|---|---|
| Augusta, Me | | | |
| Albany | | | |
| Alexandria, Va | | | |
| Brooklyn, N. Y. | | | |
| Bangor, Me | | | |
| Bath, Me | | $1 50 | 90 |
| Baltimore | | | |
| Boston, Mass | $1 25@$1 40 | 1 50 | 80@90 |
| Bridgeport, Conn. | | 1 30 | 50 |
| Bristol, R. I. | | | 80 |
| Beverly, Mass | | | 80@90 |
| Cambridge, Mass. | | | 80@90 |
| Charleston, S. C. | 1 00 | | |
| Danversport, Mas | | | |
| East Cambridge, Mass | | | |
| Fredericksbrg, Va | | | |
| Fall River | | 1 30 | 70 |
| Gloucester | | | |
| Georgetown, D.C. | | | |
| Hartford, Conn. | | | |
| Hoboken | | | 35 |
| Hudson, N. Y. | | | |
| Jersey City | | | 35 |
| Lynn, Mass | | | |
| Marblehead, Mass | 1 47½ | | |
| Middletown | | | 90 |
| Medford, Mass. | 1 70 | | |
| Nantucket, Mass. | | | 90 |
| New Bedford | | | 80 |
| Newburyport | | 1 65 | 1 00 |
| New Haven | | 1 30 | 50 |
| New London | | 1 30 | 50 |
| Newport | | | 70 |
| New York | 1 50 | 1 20 | 35 |
| New Orleans, La. | | | |
| Norfolk, Va | 70 | | |
| Norwich | | | 65 |
| Norwalk, Conn | | | 55 |
| Philadelphia | | | |
| Portland | 1 42 | 1 50 | 80 |
| Portsmouth, N.H. | | 1 65 | 90 |
| Providence | | 1 30 | 70 |
| Quincy P'nt, Mass | | | |
| Rockport | | | |
| Richmond, Va | 1 12½ | | |
| Saco | | | |
| Salem, Mass | | 1 50 | 80@90 |
| Saybrook, Mass | | | |
| Savannah, Ga | 1 25 | | |
| Somerset, Mass | | | 75 |
| St. John, N.B. | 1 40‖ | | |
| Wareham | | | |
| Washington | 1 00@1 00 | | |
| Wilmington, N.C. | | | |
| Wilmington, Del. | | | |

* And discharging and towing. † And discharging. ‡ And towing. § 3c. per bridge extra. ‖ Gold.

OFFICE OF THE PA. & N. Y. R. R. Co.,
Bethlehem, Feb. 1. 1878.

On and after this date the rate on coal for Buffalo, Watkins Ithaca and Weedsport, for water shipment; Auburn, for New York Central Railroad; Sterling, for Lake Ontario Shore Railroad, and Fair Haven, will be $1 per gross ton, between Coxton and Waverly. On coal for Rochester, via Erie R. W., Salamanca and points west thereof, an additional charge of 10 cents per ton will be made to cover transhipment charges at Waverly. The full rate from Coxton to Buffalo is $2.75, to Rochester $2.47. Local rates of August 6 will go into effect the same date.

ROBERT H. SAYRE, President.

## IRON MARKET REVIEW.

NEW YORK, Friday Evening, March 8, 1878.

**American Pig.**—We note sales aggregating from 7,000 to 8,000 tons of Thomas iron. There are further large orders pending. The furnace companies have been notified of an advance to be made on coal April 1, and, as a consequence, are unwilling to contract ahead largely. The prominent Lehigh companies are asking $19 for No. 1 foundry, and sales are being made at $18.50. There are, however, some inferior brands of iron being offered at extremely low prices without finding buyers. There is, perhaps, a shade better feeling in the iron trade, although the general demand has not increased much, if any. Credits are receiving very close scrutiny. We quote No. 1 foundry at $18@$19; No. 2 foundry, $17@18; forge, $16@$17.

**Scotch Pig.**—The business is confined to sales in small lots, aggregating about 100 tons Eglinton, and 100 tons Coltness. We quote Eglinton at $23@$23.50; Coltness, $25@$25.50; Glengarnock, $25@$25.50.

**Rails.**—We note sales of 7,000 tons of steel at about $41—at works. There are other sales pending. We quote steel rails, at mills, at $41@$43, and iron at $33@$36.

**Old Rails.**—We note a sale of 400 tons on private terms and quote at $19.

**Wrought Scrap.**—In the absence of business, we quote at about $22 from yard.

**Baltimore, Md.** March 4, 1878.

[Specially reported by Messrs. R. C. HOFFMAN & Co.]

We quote you present prices pig iron and blooms, with fair demand for best grades, viz.:

| | | | |
|---|---|---|---|
| Balt. Char. | $29 00@$30 00 | M. & White | $14 00@$15 00 |
| Va. " | 28 00@ 30 00 | C'l C.B. Blooms | 50 00@ 55 00 |
| Anth. No. 1 | 19 00@ 20 00 | " " Billetts | 55 00@ 60 00 |
| " " 2 | 18 00@ 19 00 | Refi'd Blooms | 45 00@ 50 00 |
| " " 3 | 17 00@ 18 00 | | |

**Buffalo.** March 7, 1878.

[Specially reported by Messrs. PALEN & BURNS.]

| | |
|---|---|
| No. 1 Foundry | $20 91 |
| No. 2 " | 19 91 |
| Gray Forge | 18 91 |
| American Scotch A 1 | 24 25 |
| Cherry Valley B 1 | 23 25 |
| " " No. 2 | 22 25 |

**Chattanooga, Tenn.** March 4, 1878.

[Specially reported by J. F. JAMES, dealer in iron & metals.]

| | | | |
|---|---|---|---|
| Tenn., Ala. & Ga. Charcoal, No. 1 Foundry | $18 00@$19 00 | | |
| Tenn., Ala. & Ga. Charcoal, No. 2 Foundry | 17 00@ 18 00 | | |
| Tenn., Ala. & Ga. Charcoal, Gray Forge | 15 00@ 16 00 | | |
| Tenn., Ala. & Ga. Coke, No. 1 Foundry | 19 00@ 20 00 | | |
| Tenn., Ala. & Ga. Coke, No. 2 Foundry | 17 00@ 18 00 | | |
| Tenn., Ala. & Ga. Coke, Gray Forge | 15 00@ 16 00 | | |
| Tenn., Ala, & Ga. cld B. (car-wheel) | 20 00@ 28 00 | | |
| Charcoal or Coke, white and mottled | 14 00@ 15 00 | | |
| Old rails | $18 00@$19 00 | Wr'ght scrap, No. 2 | $12 00 |
| Old car wh'ls. | 16 00@ 17 00 | Cast scrap | 10 00 |
| Wr'ght scrap, No. 1 | 17 00 | Muck bar | 32 00@ 33 00 |

*Iron Ores.*

| | |
|---|---|
| Red Hematite (about 55 per cent. metallic iron) f. o. c. at mines | $1 25 |
| Brown Hematite (about 55 per cent. metallic iron) | 1 75 |

**Cincinnati, O.** March 5, 1878.

[Specially reported by Messrs. TRABER & AUBERY, Commission Merchants for the sale of pig iron. blooms, ore, etc.]

Below please find closing quotations of our pig iron market, viz.:

CHARCOAL.

| | | |
|---|---|---|
| H'n'g Rock No. 1 Foundry & B 1 | $21 00@$22 50 | —4 mos. |
| " No. 2 " | 20 00@ 21 00 | —4 mos. |
| " Soft Silver Gray | 19 00@ 20 00 | —4 mos. |
| " Mill | 18 00@ 19 00 | —4 mos. |
| Tennessee No. 1 Foundry | 21 00 | —4 mos. |
| " No. 2 " | 20 00 | —4 mos. |
| " Mill | 18 00@ 19 00 | —4 mos. |

STONE COAL.

| | | |
|---|---|---|
| Ohio No. 1 Foundry | $20 00 | —4 mos. |
| " No. 2 " | 19 00 | —4 mos. |
| " Nos. 3 and 4 " | 18 00@ 17 00 | —4 mos. |
| " Mill | 17 00 | —4 mos. |

COKE.

| | | |
|---|---|---|
| Ohio & W. Va. No. 1 Foundry | $20 00 | —4 mos. |
| " " No. 2 " | 19 00 | —4 mos. |
| " " Mill | 17 00@ 18 00 | —4 mos. |

CAR-WHEEL.

| | | |
|---|---|---|
| H'n'g R., C. B { Hecla, Vesuvius, Etna, Jefferson. } | $36 00 | —4 mos. |
| Maryland, " Cedar Point | 37 00 | —4 mos. |
| Missouri, " Maramec | 30 00 | —4 mos. |
| Alabama, " Woodstock | 32 00 | —4 mos. |

BLOOMS.

| | |
|---|---|
| Charcoal | $45 00@$50 00—cash. |

SCRAP IRON.

| | |
|---|---|
| Cast | 40c. @ 45c.—cash. |
| Wrought | 62½c.@ $1.00—cash |

**Columbus, Ohio.** March 6, 1878.

[Specially reported by Messrs. KING, GILBERT & WARNER, dealers in Pig Iron and Ores.]

There is no noticeable improvement in the pig iron market since last report. While we hear of slight concessions being made in some instances on round lots, still prices remain generally firm and unchanged. The usual time, four months, allowed on quotations.

FOUNDRY IRONS.

| | |
|---|---|
| No. 1 Hanging Rock Charcoal | $23 50@$24 00 |
| No. 2 " " | 22 00@ 22 50 |
| No. 1 Hocking Valley soft and strong from pure limestone ores | 21 50@ 22 00 |
| No. 2 Hocking Valley soft and strong from pure limestone ores | 20 50@ 21 00 |
| No. 1 American Scotch | 20 50@ 21 00 |
| No. 1 Moxahala | 21 50@ 22 00 |
| No. 2 " | 20 50@ 21 00 |
| No. 1 Shawnee | 20 50@ 21 0 |
| No. 1 Eliza (Jackson County) | 20 50@ 21 00 |
| Silver Gray | 18 00@ 19 00 |

MILL IRONS.

| | |
|---|---|
| Gray neutral | 18 50@ 19 00 |
| Mottled and white neutral | 17 50@ 18 00 |
| Gray cold short | 17 50@ 18 00 |
| Mottled and white cold short | 16 50@ 17 00 |

**Cleveland, O.** March 5, 1878.

[Specially reported by Messrs. C. E. BINGHAM & Co.]

Per gross ton, on four months' time. Subject to change without notice.

FOUNDRY IRON.

| | | | |
|---|---|---|---|
| No. 1 L. S. Charcoal | $24 00 | Am. S., No. 1, Ch. Val | $22 00 |
| No. 2 " " | 24 00 | " " B—1, " " | 21 00 |
| No. 1 Anthracite | 21 00 | " " No. 2 " " | 19 00 |
| No. 2 " " | 19 00 | No. 1, Massillon | 22 00 |
| No. 1 Bituminous | 21 00 | B—1, " | 21 00 |
| No. 2 " | 19 00 | No. 2, " | 20 00 |

CAR-WHEEL AND MALLEABLE IRON.

| | | | |
|---|---|---|---|
| No. 3, L. S. Charcoal | $25 00 | Nos. 5 & 6, L. S. Char. | $25 00 |
| No 4. " " | 25 00 | | |

BESSEMER IRON.

| | |
|---|---|
| Nos. 1 & 2, L. S. Char | $24 00 |

FORGE IRON.

| | | | |
|---|---|---|---|
| No. 1, Gray | $18 00 | White and Mottled | $17 00 |

**Louisville, Ky.** March 5, 1878.

[Specially reported by Messrs. GEORGE H. HULL & Co.]

Business in all grades of pig metal fairly active, but at lower prices than have been reached since iron started on the down grade. The usual time, four months, allowed on quotations below:

FOUNDRY IRONS.

| | No. 1. | No. 2. |
|---|---|---|
| Hanging Rock Charcoal | $21 50@$22 50 | $19 00@$20 00 |
| Southern Charcoal | 19 00@ 20 00 | 18 50@ 19 50 |
| H'n'g Rock, Stc'l & Coke | 20 00@ 21 00 | 18 00@ 19 00 |
| Southern Stonecoal & Coke | 18 50@ 19 50 | 17 50@ 18 50 |
| "American Scotch" | | 20 00@ 22 00 |
| Silver Gray | | 17 00@ 18 00 |

MILL IRONS.

| | |
|---|---|
| No. 1 Charcoal, Cold-short & Neutral | $17 00@$18 00 |
| No. 1 Stc'l & Coke, Cold-short & Neutral | 16 50@ 17 50 |
| No. 2 Stc'l & Coke, Cold-short & Neutral | 16 00@ 17 00 |
| No. 1 Missouri and Indiana, Red-short | 20 00@ 22 00 |
| White & Mottled, Cold-short & Neutral | 14 00@ 16 00 |

CAR-WHEEL AND MALLEABLE IRONS.

| | |
|---|---|
| Hanging Rock, Cold Blast | $34 00@$37 00 |
| Alabama and Georgia, Cold Blast | 24 00@ 33 00 |
| Kentucky, Cold Blast | 25 00@ 33 00 |

**Milwaukee, Wis.** March 4, 1878.

[Specially reported by Messrs. R. P. ELMORE & Co.]

CHARCOAL IRON.

| | |
|---|---|
| No. 1 Lake Superior per gross ton | $23 00—4 mos. |
| " 2 " " " " | 22 00—4 mos. |

ANTHRACITE IRON.

| | |
|---|---|
| No. 1 Anthracite per gross ton | 24 00—4 mos. |
| " 2 " " " | 23 00—4 mos. |

STONE COAL AND COKE.

| | |
|---|---|
| Warner's Am Sc'th (Bk. Band, per ton | $25 00@ —4 mos. |
| Soft Silvery per ton | 22 00@23 00—4 mos. |
| Ohio Stone Coal | 22 00@23 00—4 mos. |

CAR WHEEL.

| | |
|---|---|
| Lake Superior ores per ton | $25 00@27 00—4 mos. |

**Pittsburg, Pa.** March 5, 1878.

[Specially reported by A. H. CHILDS.]

| | 4 mos. | | 4 mos. |
|---|---|---|---|
| No. 1 F'dry | $20 00@$21 00 | M. & White | $16 00@$17 00 |
| No. 2 " | 19 00@ 20 00 | Hot Blast Ch. | 20 00@ 25 00 |
| Gray Forge | 17 50@ 20 00 | Cold Blast W. | @ 35 00 |

**Philadelphia, Pa.,** March 7, 1878.

[Specially reported by JUSTICE COX, JR., & Co., Iron Merchants, 333 Walnut street, Philadelphia.]

**Pig Iron.**—There is a better feeling manifested in all branches of iron, the past week. Three large contracts for cast-iron pipe have been awarded. Though prices are unprecedentedly low, it gives tone to the market and makes show of consumption of at least 10,000 tons of iron in the next three months. This, with the current spring business that must come, gives quite a hopeful tone. Prices are firm, and only prompt cash will bring any concessions from full quoted prices. We report sales of about 3,000 tons, and quote No. 1 $18 to $20; No. 2, $17 to $18; No. 3, $16 to $18; all Philadelphia delivery.

**Manufactured Iron.**—There is a slightly better feeling in bars, with a few new orders coming on the market. Prices are firm on all first-class brands. In plate and tank little new is reported. The usual orders for current wants are reported, but nothing large. Nothing new is reported in skelp. It is reported that the Pennsylvania Railroad Company are about to contract for 1,000 freight cars. We quote bars 2c. per lb.; plate and tank, 2⅜ to 6c.; skelp, 2 to 2¼c. per lb.

**Rails.**—Nothing new to report in either steel or iron rails. We quote steel $41 to $43; iron $33 to $35; all at mills.

**Old Rails.**—The demand for old rails continues. We quote $20 to $21.

**Scraps** are quoted dull of sale at $20 to $24 for wrought; cast, $12 to $16.

**St. Louis, Mo.** March 6, 1878.

[Specially reported by Messrs. SPOONER & COLLINS, Commission Agents for all kinds of Iron.]

Our market has been very dull the past week and nothing doing. We anticipate an improvement in the demand for pig iron as soon as the present bad weather lets up.

COLD BLAST CHARCOAL—ALL NUMBERS.

| | | | |
|---|---|---|---|
| Hanging Rock | $25@$34 | Assorted Bar Iron | $2. rates. |
| Tennessee | 26@ | 30 No. 1 Wr'ght Scarp, | 80c. cwt |
| Kentucky | 25@ | 30 Heavy cast " | 65c. " |
| Missouri | 26@ | 28 Light " | 55c. " |
| Georgia | 24@ | 26 Old rails | $20 00@$20 50 |
| Alabama | 24@ | 26 Old carwheels | 17 00@ 18 00 |

| | No. 1. | No. 2. | Mill. | White and Mottl'd |
|---|---|---|---|---|
| Missouri stone coal | $20 50 | $21 00 | $20 00 | $19 00 |
| " charcoal | 20 50 | 19 50 | 18 50 | 18 00 |
| Tennessee charcoal | 22 00 | 21 00 | 19 00 | 17 00 |
| Tenn. coke very soft and strong | 21 00 | 20 00 | 19 00 | 17 50 |
| Hanging Rock charcoal | 25 00 | 24 00 | ..... | ..... |
| " " cold short | 22 00 | 21 00 | ..... | ..... |
| | ExNo.1 | No. 1. | BNo.1. | No. 2. |
| Alice Hanging Rock coke. | $24 00 | $23 00 | $22 50 | $21 50 |
| Quinnimount, W.Va., coke. | 24 00 | 22 50 | 21 50 | 20 50 |

## METALS.

NEW YORK, Friday Evening, March 8, 1878.

We have passed through another very quiet week, and the metal trade does not take a very hopeful view of the situation.

*Receipts of Metals at New York for the week ending March 7, 1878:*

| | Lbs. |
|---|---|
| Copper, bbls., 258 | 322,500 |
| Lead, pigs, 5,108 | 510,800 |
| Spelter, pieces, 2,816 | *140,800 |

* A piece of spelter weighs from 30 to 80 lb.; we have assumed 50 lb., as an average basis.

**Gold Coin.**—During the week under review the price of gold has ranged from 101¾ to 101¼, and closed at 101¼.

The *Public*, of yesterday, says: "Gold fell on Tuesday to a lower point than has been touched for nearly sixteen years. It would not be safe to infer that a permanent fall in gold is the result of the Silver bill, though, as we have shown, it is in the power of the Secretary of the Treasury to make gold very plenty and greenbacks very scarce, if he chooses. For at least six months, until exports again exceed imports, the situation must be one of doubt."

**Bullion.**—Silver has declined in London to 54⅛d., and continues steady here at 118¼, which is somewhat above the parity of the London rate. The market may be considered firm here at the rate given. The San Francisco quotation is 8⅛ per cent. discount. Gold bars are quoted at ⅛@¼ per cent. premium.

| DATE. | London Pence. | N. Y. Cents. | DATE. | London Pence. | N. Y. Cents. |
|---|---|---|---|---|---|
| Mar. 2 | 54⅞ | 118½ | Mar. 6. | 54¼ | 118 |
| Mar. 4 | 54¾ | 118½ | Mar. 7. | 54⅛ | 118 |
| Mar. 5 | 54¼ | 118 | Mar. 8. | 54⅛ | 118 |

*The Philadelphia Mint Coinage for February.*—The coinage at the Philadelphia Mint, for the month of February, amounted to $1,083,394, of which $424,630 was in gold, $649,610 silver and $9,154 base coinage.

The exports of specie from New York, for the week ending the 2d inst., was as under:

| | |
|---|---|
| American Silver Bars | $33,300.00 |
| Spanish Dollars | 46,008.00 |
| Mexican Gold Coin | 20,625.00 |
| | $100,358.91 |
| Foreign Silver Coin | 4,340.00 |
| Total | $109,965.00 |

SAN FRANCISCO, March 6, 1878.

*Charges against the Mint Director.*—The *Chronicle* this morning states that charges against Mint Director Linderman have been forwarded from this city to Mr. Glover, Chairman of the Committee on Expenditures of the Treasury Department. They are to the effect that Mr. Linderman directs the affairs of the Mints, especially of the San Francisco Mint, to enable private individuals to make large gains, at the expense of dealers in good faith, on trade dollars, and discloses prematurely orders of the Treasury Department, for illicit purposes.

*Preparations for the Coinage of the Silver Dollar.*—The following circular relative to the purchase of silver bullion was issued on the 6th inst.:

Notice is hereby given that the Treasury Department is prepared to receive at all times offers in writing or by telegraph, for the sale of silver bullion, in quantities not less than 10,000 ounces, deliverable at the Mints of the United States at Philadelphia, San Francisco and Carson. All offers will be addressed to the Director of the Mint, Washington, D. C., and will state the quantity and price per ounce, 1,000 fine, and when delivery will be made if the offer is accepted.

The value of silver purchased will be determined by Mint assay, and until further notice payment will be made in gold or silver coin of full legal tender. Where bullion is offered and purchased which is of a character requiring parting or refining, the seller will pay the usual Mint charges.

Under the direction of acting Cashier Whelpley, the vaults of the Treasury are being arranged for the reception of a large quantity of silver now in the Mint at Philadelphia. Seven hundred thousand dollars, the weight of which will approximate 40,000 pounds, will be received at the Treasury here in the present month. The removal from Philadelphia is for the purpose of affording space for the bullion from which the new silver dollar is to be coined. Mr. Whelpley is of opinion that a new silver vault will be necessary for the proper storage of additional coin in the Treasury building.

BULLION SHIPMENTS.

We give below a statement showing the latest bullion shipments, in addition to those announced in our issue of March 2:

| | | | |
|---|---|---|---|
| February 28. | Tybo Con., | Nevada | $68,955.00 |
| " 26. | Leopard, | " | 5,500.00 |
| " 23. | California, | " | 289,320.08 |
| " 23. | Con. Virginia, | " | 197,813.33 |
| " 23. | Northern Belle, | " | 7,944.40 |
| " 14. | Raymond & Ely, | " | 2,833.57 |
| " 20. | Chollar Potosi, | " | 6,099.32 |
| " 21. | Martin White, | " | 15,207.00 |
| " 25. | Grand Prize, | " | 2,960.00 |
| " 23. | Rifle Patch, | " | 2,600.00 |
| " 28. | Endowment, | Cal. | 3,960.79 |
| " 24. | Manhattan, | " | 15,147.75 |

**Copper.**—There have been only jobbing sales, amounting to about 100,000 lb., at 17⅛@17¼c. Large lots are quite nominal at 17@17⅛c., asked. Chili bars were quoted in London yesterday at £65.

**Tin.**—Straits in London yesterday was £64 10s. The shipments for the month of February were 210 tons. The arrivals during the week have been 7,719 slabs, which was added to an already heavy stock in hands of dealers and speculators. A fair jobbing business is reported, although there is no large business doing. We quote straits at 14¾c., gold; L. & F. 14⅛@14¾c., and Refined (which is practically out of the market), nominal at 15c.

**Tin Plates.**—A fair jobbing business is doing. We quote, in gold, per box, as follows: Charcoal tins, $5.87½@$6.12½, and ternes $5.70; coke tins, $5.25@$5.37½, and ternes, $5.37½.

Messrs. Robert Crooks & Co., of Liverpool, under date of Feb. 21, say of tin and terne plates: "This market continues depressed, and the prices are the turn lower. Charcoals are a little easier, and coke tins are selling at 16s. to 16s. 9d., according to brands. Charcoal ternes are firm, but for good cross specifications concessions can be obtained in price. Coke ternes are steady.

**Lead.**—We note a sale of 300 tons, 3⅝c. This is said to have been bought on an order given for 2,000 tons at same figure. We are also reported sales aggregating 150 tons, at 3⅝@3¾c. The latter is the asking price now. A dispatch from St. Louis, dated March 7, says:

"A largely-attended meeting of lead miners and dealers was held here this evening, and the American Pig Lead Association organized, with the following officers: President, J. Wyman Jones, of New York; Vice-Presidents, O H. Pickey, of Joplin, Missouri; H. T. Blow, of St. Louis, and Joseph Seligman, of New York. Secretary and Treasurer, John H. Taylor, of Carthage, Mo. Executive Committee—Henry T. Blow, St. Louis; Thomas K. Hannah, Kansas City; C. E. Holden and G. E. Billings, Salt Lake City; G. W. Chadbourn, St. Louis; O. H. Picker, Joplin, and Firman Desloge. The association was formed for the purpose of preventing a further decline in the prices of lead and for raising the prices if possible. Fully two-thirds of the lead mines of the country were represented. By-laws and a constitution were adopted, and a couple of hours spent in discussing questions affecting the lead interests of the country. Another meeting will be held to-morrow."

Of all the combinations lately proposed, this is apparently the least likely to be successful.

**Spelter and Zinc.**—Spelter is very quiet and weak at 5⅞c. Sheet zinc is quoted at 6¼c., with but little doing.

**Antimony.**—Seventy-five casks of Cookson's, which arrived during the week, were mostly delivered from dock at 12⅜c. gold. There have been sales of Hallett's at 12⅝@12½c., held now at 12½c.

### Salt Lake Ore and Metal Market.

SALT LAKE CITY, Utah, March 8, 1878.

*Argentiferous Lead (Base Bullion)*, $31 per ton for lead; $1.15 per ounce for silver; $20 per ounce for gold. The quotations for silver are based upon the silver in the lead of 80 to 120 ounces per ton of 2,000 lb.

The *Inter-Ocean's* correspondent under date of February 26, says: "Sales are reported for a choice lot of low grade bullion at $35 for lead and $1.15 for silver, and another lot of high grade at $30 and $1.18. We are glad to see the bullion business a little active, even at these ruinous prices. The shipments reported below are an accumulation that is going forward on smelters' account and on old contracts. The shipments of ore and bullion for the week ending February 23 are as follows: Twenty-one cars of bullion to Pittsburg, eleven cars of bullion to New York, twenty-two cars of bullion to Newark, twenty-four cars of bullion to Omaha, five cars of lead ore to Hilliard, one car copper matte to Phœnixville, Pa. Bullion, 1,646,893 lb.; lead ore, 107,500 lb.; copper matte, 21,391 lb.; total, 1,775,684 lb.

"The Wasatch Furnaces were burned on the 24th inst., the work of an incendiary. Loss about $20,000; no insurance."

Mr. J. B. Meader, under date of February 16, reports the following shipments:

| | |
|---|---|
| Shipments of base bullion for January, 1878 | 3,727,592 lb. |
| Ore shipments reduced to lead | 84,307 lb. |
| Total shipments of lead for January, 1878 | 3,811,899 lb. |
| Same time for 1877 | 4,814,621 lb. |
| Decrease in 1878 | 1,002,922 lb. |

*Montana Bullion Shipments.*—During the week ending February 18, there was shipped from Butte, by Wells, Fargo & Co.'s Express, 1,643¾ pounds of fine bullion, valued at $26,375.80. Work has been resumed at the Burlington Mill, but as yet no bullion has been shipped from it, the above amounts being forwarded from the Lexington, Dexter and Walker Brothers' Mills.

The ore shipments east from California, *via* the Central Pacific R. R., for the month of January, amounted to 58,690 pounds.

## FINANCIAL.

### New York Stocks.

NEW YORK, Friday Evening, March 8, 1878.

There is no special feature observable in the dealings in coal shares on the New York market. The quotations are lower and but little activity or interest is manifested in the transactions. Sixty thousand shares will represent the total sales for the week and 2 per cent. the extreme range in the price of any stock on the list.

*Golden, Boulder & Caribou Railroad.*—This road now has track laid from Boulder, Colo., southeast six miles to the Marshall coal mines. The road is of standard gauge, and has been built as a branch or extension of the Denver Boulder Valley road to the Marshall Mines.

*East Tennessee & Western North Carolina Railroad.*—Local papers report that work is to be begun shortly on the construction of this road from the East Tennessee, Virginia and Georgia road at Johnson, Tenn., east to Cranberry, N. C. The distance is about 33 miles, and the road will be of three-feet gauge. It will be built by Pardee & Co., of Pennsylvania, who own the large bed of magnetic iron ore at Cranberry, to reach which the road will be built.

*The Monongahela Valley Railroad Company* has been incorporated at Wheeling, W. Va., and will construct and operate a railroad from a point on the Pennsylvania line in the county of Monongahela, up the ravine of the Monongahela river through the counties of Monongahela and Marion to Fairmount. Capital stock, $500,000. All the incorporators reside at Fairmount.

*Pilot Knob Iron Co.*—We note a recent quotation of this company's stock of $31 per share, asked.

### Miscellaneous Stocks and Quotations.

Sales and quotations of the stocks and bonds dealt in here, at Philadelphia and Baltimore for the week ending the 8th inst are given in the following tables. The Philadelphia quotations will have a * affixed. The Baltimore quotations are indicated thus †.

| STOCKS. | Par Value. | High'st | Lowest | Closing | Sales: Shares. |
|---|---|---|---|---|---|
| American Coal Co. | $25 | ..... | ..... | 32 | ..... |
| St.L.,I.M.& S.R.Co.. | 100 | 5⅛ | 5⅛ | 5 | 119 |
| Spring Mt. Coal Co. | 50 | ..... | ..... | 35 | ..... |
| *Cambria Iron Co.. | 50 | ..... | ..... | 51½ | 25 |
| *Penn. Salt M'g Co. | 50 | ..... | ..... | 60 | ..... |
| *Westm'land C. Co. | 50 | ..... | ..... | 65 | ..... |
| *Buck Mt. Coal Co.. | 50 | ..... | ..... | 30 | ..... |
| *Schuyl. Nav. Co... | 50 | ..... | ..... | ..... | ..... |
| †Balt.& O.RR.Co.pf | 100 | ..... | ..... | 95 | ..... |
| " " " com | 100 | 88 | 86 | ..... | 28 |
| †George's C'k C. Co | 100 | ..... | ..... | 90 | ..... |
| †S. Clara M'g Co... | 100 | ..... | ..... | 25c. | ..... |
| †Atlantic Coal Co. | 10 | ..... | ..... | 1.00 | ..... |

| BONDS. | Princ'l. When Due. | Int'est. When Due. | Hig'st. | Lowest | Amount. |
|---|---|---|---|---|---|
| D., L. & W., 7s, conv | 1892 | J. & D. | ..... | 100 | ..... |
| " " " 2d mtge. | 1881 | M. & S. | ..... | 103¼ | ..... |
| N.J.C., 1st mtge. new | 1890 | F. & A. | 110¾ | ..... | $14,000 |
| " " " 1st mtge., con | 1899 | Q. | 64¾ | 64¼ | 16,000 |
| " " " convt. | 1902 | M. & N. | 63¾ | 63½ | 12,000 |
| Lehigh & W. B., con | 1899 | Q. | 35½ | 35 | 45,000 |
| Am. Dock & Imp. 7s | ..... | J. & J. | 43¾ | 43⅜ | 40,000 |
| St.L.I.M.& S..1st mt | 1892 | F. & A. | 105 | 104½ | 18,000 |
| Ches. & O., 1st mtge | 1899 | M. & N. | 23 | ..... | 3,000 |
| D & H C Co., 1st m.rg | 1884 | J. & J. | 96 | 94½ | 10,000 |
| " " " " " " | 1891 | J. & J. | 97 | ..... | 5,000 |
| " " " " m.loan cp | 1894 | A. & O. | 95 | ..... | 4,000 |
| " " " " " rg. | 1894 | A. & O. | 95½ | ..... | 2,000 |
| " " " " new mge. | ..... | ..... | ..... | ..... | ..... |
| *L.V.R., 1st m. 6s. cp. | 1808 | J. & D. | ..... | ..... | ..... |
| " " " rg. | 1898 | J. & D. | ..... | ..... | ..... |
| " " " 2d m. 7s, rg. | 1910 | M. & S. | 113 | ..... | 1,000 |
| " " " con. m. 6s, rg | 1823 | J. & D. | 98 | ..... | 1,000 |
| " " " 6s cp. | 1923 | J. & D. | ..... | ..... | ..... |
| *Pa. RR., 1st m. 6s, cp | 1880 | J. & J. | 104¾ | 104⅝ | 3,000 |
| " " g. m., 6s, cp. | 1910 | J. & J. | 107¼ | ..... | 5,000 |
| " " " 6s, rg. | 1910 | A. & O. | 109 | ..... | 1,000 |
| " " con. m. 6s, rg. | 1905 | Q. | ..... | ..... | ..... |
| " " " 6s, cp. | 1905 | J. & D. | ..... | ..... | ..... |
| " " new loan, 5s | ..... | ..... | 110½ | ..... | 17,100 |
| *P. & R. R., 1st m. 6s, R. C. 43-44 | 1880 | J. & J. | 103½ | 103¼ | 2,000 |
| P. & R. R., 1st m. 6s, R. C. 48-49 | 1880 | J. & J | ..... | ..... | ..... |
| P. & R. R., 2d m. 7s cp | 1893 | A. & O. | ..... | ..... | ..... |
| " " " scrip | 1882 | J. & J. | 59 | ..... | 1,150 |
| " " " in. m. 7s, cp | 1896 | J. & D. | 60½ | ..... | 1,000 |
| " " " c. m. 7s, cp. | 1911 | J. & D. | 100½ | 100 | 5,000 |
| " " " " 7s. rg. | 1911 | J. & D. | ..... | ..... | ..... |
| " " " cvt. 7s, R.C | 1893 | J. & J. | 50 | 46 | 2,100 |
| " " C. & I. Co., Deb 7s, R. C. | 1892 | M. & S. | 43 | ..... | 7,000 |
| P. & R.C. & I. Co., m. 7s, R. C. | '92-3 | various | ..... | ..... | ..... |
| L. Nav. Co., 6s, rg. m. | 1884 | J. & Q. | 103½ | 100 | 2,956 |
| " " RR., rg. m. | 1897 | F. & Q. | 102 | ..... | 1,600 |
| " " cvt. co. G. R. | 1894 | M. & S. | ..... | 96 | ..... |
| " " " Gold R. C. | 1897 | J. & D. | 87 | 86½ | 51.000 |
| " " con. m. 7s, rg. | 1911 | J. & D. | ..... | 73 | ..... |
| *P. & N.Y.C., 7s, R.C. | 1896 | J. & D. | ..... | ..... | ..... |
| | 1906 | J. & D. | ..... | ..... | ..... |
| *Pa. Canal, 6s. cp.. | 1910 | J. & J. | ..... | 57 | ..... |
| *Schuyl. Nav., 1st m. 6s. rg. | 1897 | M. & Q. | ..... | 89 | ..... |
| *Sus. Coal, 6s, rg... | 1911 | J. & J. | ..... | 75 | ..... |
| †Balt. & O. RR., 6s.. | 1880 | J. & J. | ..... | ..... | ..... |
| " " " " 6s.. | 1885 | A. & O. | 105½ | 105 | 2,000 |
| Total transactions for the week | | | | | $236,906 |

## Philadelphia Stocks.

PHILADELPHIA, Friday Evening, March 8, 1878.

Without exception, the Philadelphia market for coal stocks is lower, some of the quotations showing a decline equal to 2½ per cent. from the prices prevailing a week ago. The transactions aggregate about 93,000 shares—a very small proportion of which represents actual business. We take the following from the *Ledger* of to-day:

"The more speculative shares, according to the *reported* sales yesterday, were quite large, though not nearly so large as those reported for the day or two previous. As we have heretofore shown, many of these reported sales are "washes" and fictions, no corresponding amount of stock being transferred and little or no money passing between the pretended buyers and sellers. As in point: During the week the clearing-house of the Stock Board shows reported sales of 82,200 shares of the stock of the Pennsylvania Railroad Company, when but 5,800 shares of stock actually passed. In the same time sales of 16,000 shares of Reading Railroad were reported, when but 2,200 shares actually passed, and of Lehigh Coal & Navigation sales of 3,500 shares were reported, when but 700 shares actually passed. * * * * We do not see exactly how these offenses can be entirely prevented, but they ought to be, and the Board should spare no effort to detect the guilty and to inflict the prescribed penalty to its utmost limit. We know that many of the members of our Stock Board are highly honorable gentlemen, and probably, as a whole, no association of business men take more pains to maintain character for integrity of purpose than do the Philadelphia Board of Brokers.

AUCTION SALES.

*Pennsylvania Canal Co.*—$1,000 6 per cent. bonds at 59 per cent.

*Mine Hill & Schuylkill Haven R. R.*—49 shares at $47 per share.

*Pennsylvania Salt Manufacturing Co.*—302 shares at $65 per share.

## Copper Stocks.

Reported by Wilson W. Fay & Co., Brokers in Mining and Miscellaneous Stocks, Room 7, Traveller Building, 31 State street.

BOSTON, Wednesday Evening, March 6, 1878.

The market for the week has been quiet, and very few transactions have taken place, and those mostly in the larger stocks, while the smaller ones, with the exception of a few sales and a couple of "washes" might just as well have been off the list altogether, for the value of business in them.

Things are looking so unusually quiet that we should not be surprised to see them take a sudden jump, as we usually have a quiet spell like this before a rise.

Calumet & Hecla has sold down to 176⅞, but has stiffened again and is now 177½ bid, and 178 asked, and sales at 178.

Copper Falls is acting very curiously looking strong at one moment and weak at another. There have been a few "washes" in it, but for what purpose is not apparent, as the stock is now lying quiet, as though awaiting something to stir it up. It closes 1⅝@1⅞.

Franklin sold at 6½, a small lot of five shares, and is firmer at the close, 7 being bid, and 7½ asked.

National is very weak, stock offering, assessment paid, at .35, and .27 best bid.

Osceola remains about the same, with no events of importance transpiring.

Quincy has fallen suddenly without any large amount of stock changing hands, and closes 32½@33.

Ridge remains quiet, as usual, at 1¼@1½. Duncan has declined and sold at 1¾, and closes 1⅝@1¾.

International seems to be in demand, and is looking very firm, there being buyers of large amounts at 25, which is a little under the market, and therefore looks like an effort to bull. It closes 30@35.

Merrimac Silver closes 4@4½.

The Annual meeting of the Central Mining Company will be held at the office of the Company in New York City, on April 1, 1878.

## Gold and Silver Stocks.

NEW YORK, Friday Evening, March 8, 1878.

The business at the Mining Exchange shows a still further decrease. The low-priced stocks make up more than five-sixths of the business. It was expected that one or more new stocks would be called during the week and that some life would be given to business; but in this the brokers were disappointed. The Kearsarge, which was to have been called, has been indefinitely postponed, the management claiming that it will not be called until the mine can declare dividends. This is a very wise determination, and could be followed advantageously by other mines proposing to seek a representation here. American declined from 10½ at the opening to 9½ on Wednesday, with sales of but 300 shares. Moose has been dealt in to the extent of 13,300 shares at 8¼@8⅞. There has been more activity in New York & Colorado, the sales amounting to 2,000 shares at $2.25@2.55. Ontario, with a business of 1,487 shares, advanced from 33 to 35½. Seaton is also receiving greater attention, the sales aggregating 1,100 shares, although the price has declined. The mortgage which recently existed against this property has been satisfied by prominent stockholders of the company, and it is reported that the lessee has struck richer ore than ever before found in the mine. The sales of American Flag have been 20,100 shares at 24@21c.; Bertha & Edith, 67,400 shares at 12@15c.; Lacrosse, 42,500 shares, at 61@71c.; King's Mountain, with sales of 1,200 shares, has ranged from $2.65@2.20.

The California and Consolidated Virginia each declared a dividend of $2 per share yesterday.

The Plumas National Quartz Mining Co., organized under the laws of California, with a capital of $1,000,000 in 100,000 shares of $10 each, has been entered on the list of the Mining Exchange. According to a prospectus issued, the property is situate about six miles from Greenville, in Plumas County, California. According to R. M. Wilson, U. S. Deputy Mineral Surveyor for California, there is in sight 40,000 tons of ore, valued at $480,000, and he estimates that the cost of mining and milling the ore will be about $4 per ton, leaving $320,000 as the net value. He further says the net *capacity* of the present mill is $5,200 per month—equal to about 6 per cent. on the capitalization. He estimates the cost of improvements at $45,000, and recommends the erection of a forty-stamp mill, which he says would give a net income of over $20,000 per month. These estimates, as well as some other statements in the prospectus of the company, are, to say the least, exceedingly sanguine. It is, also, not quite clear from the company's prospectus that the title to some of the property is fully established, that "routine required by the department at Washington," which has to be complied with, being somewhat indefinite.

*The Gold Placer Mining Co.*, organized under the State laws of Connecticut—President, H. G. Angle; Secretary and Treasurer, C. Goddard—is the Company mentioned by Gov. Hubbard, of Connecticut, as one of the companies starting business without a cent paid in on its $5,000,000 capital. The Company claims to own 25,000 acres of gold-bearing gravel. The stock (par value $25 per share) is, we understand, to be issued at $3 per share, making a value of $600,000 for the property—certainly an enormous price for comparatively undeveloped property, and excessive as compared with the selling prices of similar property in that and other parts of Colorado. It seems certain that the property is really valuable, but exorbitant capitalization and excessive price is likely to be injurious to its profitable development.

Both of the above-mentioned properties will probably be called early in the week.

The Quicksilver Mining Co. will not publish its annual report for 1877 until July. The object of this delay is to avoid a greatly increased taxation, should the bill now before the California Legislature, entitled "An act to encourage mining enterprise and suppress stock gambling," be passed.

The Moose Silver Mining Co. has declared a regular quarterly dividend of 2½ per cent., payable on the 15th inst. This makes $550,000 of dividends paid since the mine was opened, and the third consecutive quarterly dividend of $50,000 since the reorganization of the company. This is a very good mine, and at the present average market price of the stock (say 8½), is paying over 11¾ per cent. per annum.

*Mariposa.*—A letter from the President of the Mariposa Land & Mining Co. says: "The by-laws have been amended, and copies have been sent for distribution among the New York stockholders. A $1 assessment only can be made every six months, none before August. I expect to have the works started by March 20."

The stock of the Eureka Consolidated Silver Mining Company shows a decided decline from the quotations of a week ago, yesterday's price in San Francisco being $37½ per share, and the stock selling on this market to-day at $40½ per share. The *Stock Report* of the 1st inst. says of this mine:

"The Eureka Consolidated mine was opened in 1871 and has been worked continuously since. Its record is as follows:

| Year. | Tons. | Avr. | Product. | Dividends. |
|---|---|---|---|---|
| 1871 | 18,847 | $30 | $556,276 | $275,000 |
| 1872 | 32,170 | 36 | 1,159,509 | ..... |
| 1873 | 25,692 | 63 | 1,624,282 | 200,000 |
| 1874 | 22,831 | 56 | 1,287,406 | 175,000 |
| 1875 | 49,894 | 29 | 1,425,206 | 350,000 |
| 1876 | 16,800 | 36 | 602,829 | ..... |
| 1877 | 43,141 | 40 | 1,724,066 | 600,000 |
| Total | 209,375 | $40 | $8,379,574 | $1,600,000 |
| Assessments | | | | 100,000 |
| Net profits | | | | $1,500,000 |

To this should be added dividends of January and February of the present year, which increase the profits to $1,800,000, or $36 per share. The mine is yielding better than ever now.

Ontario is selling at enhanced rates. The February product of this Company amounted to $143,489.92. This Company has declared dividends Nos. 21 and 22, of $50,000 each, payable on the 15th inst.

The *San Francisco Stock Report* of the 1st inst., in noting the improvement gradually manifesting itself in mining shares on that market says: "Eastern capital also is coming this way in liberal streams. It is not wonderful that this should be when we take into account the immense returns for investments and the security we offer as compared with the railroad stocks and their rascally manipulation in the East. At 22½, Con. Virginia yields over 100 per cent. a year, at the rate of $2 per share monthly. California yields in almost the same ratio. Eureka Consolidated pays at the rate of $3 per month, over 75 per cent per annum. Grand prize, which has fully a year's dividends in sight at the mine, and with the well-defined prospect that its ore body will continue to great depths, pays $1 per month, almost 100 per cent. per annum, on the present price, which is slightly above $12 per share. Eastern capitalists have invested freely in these and other dividend-paying shares after a most careful examination of the merits of the mines. It is not to be expected that the same bonanza can last for ever, but enough has been demonstrated to prove that the above stocks are a good investment at current rates. They are so viewed in the East, and are recommended by leading bankers and business men.

Assuredly, there are no Eastern securities of any nature whatever that can for a moment offer figures to compare with the above, and the developments are such as to promise permanency, at least for a long period, all of which is subject to the usual San Francisco discount.

SAN FRANCISCO MINING STOCK QUOTATIONS.

*Daily Range of Prices for the Week.*

| NAME OF COMPANY. | CLOSING QUOTATIONS. Mar. 2. | Mar. 4. | Mar. 5. | Mar. 6. | Mar. 7. | Opening. Mar. 8. |
|---|---|---|---|---|---|---|
| Alpha | 11 | 10½ | 10¾ | 10 | 10¼ | ..... |
| Belcher | 4¾ | 4¾ | 4¾ | 4½ | 4½ | ..... |
| Best & Belcher | 23¼ | 23 | 23¼ | 21½ | 22¼ | ..... |
| Bullion | 6 | 6¼ | 6½ | 6¼ | 5¼ | ..... |
| Caledonia | 2¾ | 2½ | 2¾ | 2¾ | 2¾ | ..... |
| California | 29 | 30 | 30 | 30 | 30 | ..... |
| Chollar-Potosi | 34¾ | 34¼ | 34¼ | 33¾ | 33½ | ..... |
| Con. Imperial | ..... | ..... | ..... | ..... | ..... | ..... |
| Con. Virginia | 23 | 22½ | 22½ | 22½ | 23¾ | ..... |
| Confidence | 5 | 5 | 5 | 5 | 5 | ..... |
| Crown Point | 5¾ | 5¾ | 5½ | 5¼ | 5½ | ..... |
| Eureka Con | 41 | 42 | 39 | 39 | 37½ | ..... |
| Exchequer | 4 | 4¼ | 4½ | 4¼ | 3½ | ..... |
| Gould & Curry | 9½ | 9½ | 9½ | 8¾ | 8¾ | ..... |
| Grand Prize | 12¾ | 12¼ | 10¼ | 10¼ | 8 | ..... |
| Hale & Norcross | 10½ | 10¼ | 10 | 10½ | 10 | ..... |
| Julia | 2¼ | 2½ | 2½ | 2½ | 2½ | ..... |
| Justice | 10¼ | 9½ | 9 | 8½ | 8¾ | ..... |
| Kentuck | 3¾ | 3¼ | 4 | 3¼ | 3½ | ..... |
| Mexican | 14 | 14 | 13½ | 13½ | 13¾ | ..... |
| Northern Belle | 10½ | 10 | 9 | 8¾ | 9 | ..... |
| Ophir | 54 | 53¾ | 53 | 53¼ | 53½ | ..... |
| Overman | 16 | 16 | 16 | 15¼ | 14½ | ..... |
| Raymond & Ely | 5 | 5 | 5 | 4¾ | 4¾ | ..... |
| Silver Hill | 2¾ | 2½ | 2½ | 2¼ | 2¼ | ..... |
| Savage | 12¼ | 12¼ | 11¾ | 11¼ | 10¾ | ..... |
| Seg. Belcher | 26 | 26 | 26 | 26 | 26 | ..... |
| Sierra Nevada | 4¾ | 4¾ | 4¾ | 4½ | 4½ | ..... |
| Union Con | 6 | 6 | 6 | 5¾ | 5¾ | ..... |
| Yellow Jacket | 11 | 10¾ | 10¾ | 10¾ | 10½ | ..... |

The *Commercial Herald* of the 28th ult., says of the market: "The mining stock market continues to be characterized by a most unsatisfactory degree of apathy, though the leading stocks are well maintained and the sales about as usual; however, the operations are apparently so forced in character that we fear the *bona-fide* sales do not nearly reach the aggregate our record shows for the week."

The Gold Hill *News* of the 27th ult., summarizes its Mining News as follows: "Mining developments are going ahead with great energy and a lively degree of hopefulness, induced by good prospects ahead. The new ore vein found east of the Consolidated Virginia mine, increases in value and importance as further developed. A fine vein of rich ore has been developed since last week's report, below the 800 level of the Justice mine, and Silver Hill has a nice little ore vein, which bids fair to prove a paying one. Preparations are being made in the old Yellow Jacket mine for sinking deeper below the 2,200 level, and the C. & C. shaft of the bonanza mines is going deeper. Thus it will be seen that those having the most money invested, and paying the most of the expenses, have full faith in deeper working, and that they will be fully repaid in doing so.

"In the Ophir almost the entire capabilities of the mine are being concentrated at three different points: First, the connecting of the two south drifts on the 1,900 level on the California line; second, reaching the point where the east drift on the 1,800 level will cut the ore vein, if it reaches upward to that point; third, sinking the main incline shaft to open up a new level at the earliest day possible.

"In the Justice two important ore discoveries have been made during the week; one at a depth of 750 feet, and only a short distance from the Silver Hill line, on the south, and the other, a streak of immensely rich ore, varying from a foot to three feet in thickness, sixty feet below the 800 level, 320 feet from the south line. The ore in this last is as fine black sulphuret, intermixed with stephenite, ruby and native silver, as has ever been found on the Comstock. The north drift on the 1,150 level has now penetrated to within 100 feet of the Lady Washington line, and is developing good milling ore.

"The greatest interest is, however, concentrated in the development of the new bonanza supposed to lie somewhere toward the north end. Just what mine is to be honored with its paternity is yet a subject of doubt, but that the new ore body in the Consolidated Virginia is opening out beyond all expectations cannot be denied, and that it bids fair to extend both north and southward into both the Best & Belcher and California, is now hardly doubted."

*Sutro Tunnel.*—Total length of tunnel on February 27, 19,030 feet. Average rate of progress, 7½ feet per day. The face of the header is in fair working ground, with but a very moderate flow of water. Temperature of the air at the header, 108 degrees. Everything working well.

*The New York Mining Stock Exchange* has issued the following circulars:

The Governing Committee (February 28, 1878) have established a class of registered dealers, the privilege to such dealers to be the permission to members of this Exchange to transact business for such dealers at one-half of the rates of commission currently established by the Exchange.

# COAL TRANSPORTATION AND GENERAL MINING STOCKS.

## COAL STOCKS.

| NAME AND LOCATION OF COMPANY. | | Feet on Vein. | Capital Stock. | SHARES. No. | Par Val. | ASSESSMENTS. Total levi'd to date. | Date and amount per share of last. Mo. | Yr. | Amt. | DIVIDENDS. Total paid to date. | Last Dividend. Mo. | Yr. | Amt. | Rate per Ann. | HIGHEST AND LOWEST PRICES PER SHARE IN CURRENCY AT WHICH SALES WERE MADE. N. B.—Quotations of D., L. & W. R. R., and Pa. Coal Co. are per $100—two shares. Mar. 2. H. | L. | Mar. 4. H. | L. | Mar. 5. H. | L. | Mar. 6. H. | L. | Mar. 7. H. | L. | Mar. 8. H. | L. | SALES. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | $ | | | $ | | | | $ | | | | Per c'nt | | | | | | | | | | | | | | | |
| Consol. Coal | Md. | ..... | 10,250,000 | 102,500 | $100 | * | ..... | ..... | ..... | ..... | Jan. | 1877 | 2½ | | 47⅛ | 46⅞ | 47 | 46 | 47 | 45¾ | 47 | 46¾ | 46¾ | 46¾ | 47 | 46¾ | | 6,312 |
| Del. & H. Canal | Pa. | ..... | 20,000,000 | 200,000 | 100 | * | ..... | ..... | ..... | 38,821,104 | Aug. | 1876 | 4 | 9 | 47⅜ | 47 | 47¾ | 47⅛ | 47¼ | 46⅝ | 47¼ | 46⅝ | 47 | 46⅝ | 47⅛ | 46½ | 54,512 | |
| Del., Lac. & W. R. R. | Pa. | ..... | 26,200,000 | 524,000 | 450 | * | ..... | ..... | ..... | ..... | July | 1876 | 2½ | 5 | 47⅜ | 47 | 47¾ | 47⅞ | 47½ | 46⅜ | 47¼ | 46⅜ | 47 | 46⅝ | 47⅛ | 46½ | | |
| Lehigh C. & Nav. | Pa. | ..... | 10,448,550 | 208,971 | 50 | * | ..... | ..... | ..... | ..... | Nov. | 1876 | 1½ | 5½ | 17¾ | 17⅛ | 17⅝ | 17½ | 17⅜ | 17¼ | 17¼ | 16⅞ | 16⅞ | 16⅝ | 17 | 16¾ | 4,188 | |
| Lehigh Valley R. R. | Pa. | ..... | 27,042,900 | 540,858 | 50 | * | ..... | ..... | ..... | ..... | | | | | 38⅝ | 38¼ | 38¾ | 38⅜ | 38⅜ | 38⅜ | 38⅜ | 38⅜ | 38⅜ | 38⅜ | 38⅛ | 38¼ | 778 | |
| Maryland Coal | Md. | ..... | 4,400,000 | 44,000 | 100 | * | ..... | ..... | ..... | ..... | Jan. | 1876 | 1½ | 1½ | 9 | 9 | | | | | | | | | | | 400 | |
| N. J. Central R. R. | Pa. | ..... | 20,600,000 | 206,000 | 100 | * | ..... | ..... | ..... | ..... | Apr. | 1876 | 2½ | 2½ | 16¼ | 16 | 15¾ | 15½ | 16 | 15¾ | 15¾ | 15¼ | 15½ | 15 | 15¼ | 14½ | 3,417 | |
| Pennsylvania Coal | Pa. | ..... | 5,000,000 | 100,000 | 50 | * | ..... | ..... | ..... | ..... | Feb. | 1878 | 3 | | | | | | | | | | | | | | | |
| Pennsylvania R. R. | Pa. | ..... | 68,870,200 | 1,337,404 | 50 | * | ..... | ..... | ..... | ..... | May. | 1877 | 1¼ | 8 | 29⅛ | 28¾ | 29⅛ | 29 | 29 | 28⅛ | 28⅝ | 27 | 27½ | 27 | 27⅝ | 27½ | 73,501 | |
| Phil. & Read. R. R. | Pa. | ..... | 34,278,175 | 685,563 | 50 | * | ..... | ..... | ..... | 43,012,497 | Jan. | 1876 | 2¼† | 10 | 14⅞ | 14⅜ | 14½ | 14⅜ | 14¼ | 14 | 14 | 13⅝ | 13¾ | 13⅛ | 13⅜ | 13¼ | 14,778 | |

## GENERAL MINING STOCKS.

### Dividend Paying Mines.

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| American | Col. | ..... | 1,000,000 | 100,000 | 10 | * | ..... | ..... | ..... | 30,000 | Feb. | 1878 | $0 10 | 12 | 10½ | ..... | ..... | ..... | 10¼ | ..... | 9½ | ..... | ..... | ..... | ..... | ..... | ..... | 300 | |
| Belcher, G. S. | Nev. | 1,040 | 10,400,000 | 104,000 | 100 | 1,176,400 | Dec. | 1877 | 1 00 | 15,397,200 | Apr. | 1876 | 1 00 | 12 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Bobtail, G. | Col. | 2,500 | 1,156,630 | 227,326 | 5 | * | ..... | ..... | ..... | 56,831 | Nov. | 1877 | | 25 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Bobtail Tunnel, G. | Col. | ..... | 100,000 | 20,000 | 5 | 52,000 | July | 1873 | 0 30 | 40,000 | Dec. | 1877 | | 50 | 20 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| California, G. S. | Nev. | 600 | 54,000,000 | 540,000 | 100 | ..... | ..... | ..... | ..... | 23,760,000 | Feb. | 1878 | 2 00 | 24 | 31 | ..... | ..... | ..... | 31 | ..... | ..... | ..... | 31 | ..... | ..... | ..... | ..... | ..... | 40 |
| Calumet & Hecla, C. | Mch | ..... | 2,000,000 | 80,000 | 25 | 1,000,000 | ..... | ..... | ..... | 12,650,000 | Feb. | 1878 | 5 00 | 20 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Central, C. | Mch | ..... | 500,000 | 20,000 | 25 | 100,000 | June | 1862 | 0 65 | 1,260,000 | Feb. | 1878 | 5 00 | | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Chollar Potosi, G. S. | Nev. | 1,400 | 2,800,000 | 28,000 | 100 | 1,578,000 | Jan. | 1878 | 3 00 | 3,080,000 | Feb. | 1872 | 1 00 | | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Copper Falls, C. | Mch | ..... | 1,000,000 | 20,000 | 50 | 535,000 | May. | 1876 | | 100,000 | Nov. | 1871 | 1 00 | | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Cons. Virginia, G. S. | Nev. | 710 | 54,000,000 | 540,000 | 100 | 474,600 | June | 1873 | 3 00 | 37,800,000 | Feb. | 1878 | 2 00 | 24 | ..... | ..... | 24½ | 23⅝ | ..... | ..... | 23½ | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 15 5 |
| Confidence, G. S. | Nev. | 130 | 2,496,000 | 24,960 | 100 | 243,840 | Mar. | 1873 | 1 00 | 78,000 | May. | 1865 | 8½ | 8½ | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Cons. Her. & Roe | Col. | 16,500 | 1,000,000 | 100,000 | 10 | * | ..... | ..... | ..... | 120,000 | | | | | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Crown Point, G. S. | Nev. | 600 | 10,000,000 | 100,000 | 100 | 1,673,370 | Jan. | 1878 | 1 00 | 11,588,000 | Jan.. | 1875 | 2 00 | 24 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Eureka Cons., G. S. L. | Nev. | ..... | 5,000,000 | 50,000 | 100 | 100,000 | May | 1876 | 1 00 | 1,600,000 | Feb. | 1878 | 3 00 | 24 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 40½ | ..... | ..... | 100 | |
| Eureka G. Mg., G. | Cal. | 1,680 | 2,000,000 | 20,000 | 100 | ..... | ..... | ..... | ..... | 2,134,000 | Aug. | 1877 | 2 00 | | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Franklin, C. | Mch | ..... | 500,000 | 20,000 | 25 | 360,000 | June | 1876 | 5 00 | 585,000 | Nov. | 1871 | 1 00 | | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Gould & Curry, G. S. | Nev. | 612 | 10,800,000 | 108,000 | 100 | 2,558,000 | Dec. | 1877 | 1 00 | 3,826,800 | Oct. | 1870 | 10 00 | | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Grand Prize | Nev. | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1,200,000 | Feb. | 1878 | 1 00 | | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Hale & Norcross, G. S. | Nev. | 400 | 11,200,000 | 112,000 | 100 | 2,746,000 | Dec. | 1877 | 1 00 | 1,598,000 | Apr. | 1871 | 5 00 | 12 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Hukill, G. S. | Col. | 3,288 | 1,000,000 | 100,000 | 10 | * | ..... | ..... | ..... | 130,000 | Feb. | 1878 | 0 10 | 12 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 4.60 | 4½ | ..... | ..... | 110 | |
| Kentuck, G. S. | Nev. | 95 | 3,000,000 | 30,000 | 100 | 270,000 | Dec. | 1874 | 1 00 | 1,252,000 | Mar. | 1870 | 5 00 | | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Leopard, L. G. S. | Nev. | 1,500 | 5,000,000 | 50,000 | 100 | 125,000 | Feb. | 1878 | 50 | 162,500 | Dec. | 1876 | 0 50 | | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Merrimac, S. | Mas. | 1,500 | 500,000 | 100,000 | 5 | * | ..... | ..... | ..... | 110,000 | Jan. | 1878 | 0 10 | 12 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Minesota, C. | Mch. | ..... | 1,000,000 | 20,000 | 50 | 436,000 | June | 1869 | 1 00 | 1,820,000 | Mar. | 1876 | 0 50 | | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Moose | Col. | 39,000 | 2,000,000 | 200,000 | 10 | ..... | ..... | ..... | ..... | 175,000 | Jan. | 1878 | 0 25 | 10 | 8¾ | 8⅝ | 8¾ | 8⅝ | 8⅞ | 8½ | 8¾ | 8½ | 8¾ | ..... | 8¾ | 8⅝ | 13,300 | |
| National, C. | ..... | ..... | 500,000 | 50,000 | 25 | 195,000 | Oct. | 1875 | 1 00 | 360,000 | Oct. | 1873 | 1 00 | | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| N. Y. & Colorado, G. | Col. | ..... | 1,000,000 | 50,000 | 20 | * | ..... | ..... | ..... | 20,000 | Mar. | 1877 | 0 20 | | ..... | ..... | 2.40 | ..... | 2.40 | 2¼ | 2.55 | 2.40 | 2½ | 2.45 | 2.55 | 2.40 | 2,000 | |
| Northern Belle, S. | Nev. | 1,600 | 5,000,000 | 50,000 | 100 | ..... | ..... | ..... | ..... | 1,425,000 | Feb. | 1878 | 1 00 | | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Ontario. | Uth. | 3,000 | 10,000,000 | 100,000 | 100 | ..... | ..... | ..... | ..... | 900,000 | Jan. | 1878 | 0 50 | 6 | 33 | ..... | 34 | 33 | 34½ | 34 | 34½ | 34 | 35½ | 34¾ | 35 | ..... | 1,487 | |
| Ophir, G. S. | Nev. | 675 | 10,080,000 | 100,800 | 100 | 3,035,200 | Jan. | 1878 | 1 00 | 1,394,400 | Mar. | 1864 | 4 00 | | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Pewabic, C. | Mch. | ..... | 500,000 | 20,000 | 25 | 185,000 | June | 1865 | 3 00 | 460,000 | July | 1873 | 1 00 | | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Phœnix, C. | Mch. | ..... | 1,000,000 | 20,000 | 50 | 817,500 | Sept. | 1870 | 3 00 | 20,000 | Jan. | 1876 | 1 00 | | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Polar Star, G. S. | Col. | 1,300 | 500,000 | 50,000 | 10 | * | ..... | ..... | ..... | 5,000 | Jan. | 1878 | 0 10 | | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Quincy, C. | Mch. | ..... | 200,000 | 20,000 | 10 | ..... | ..... | ..... | ..... | 2,130,000 | Feb. | 1877 | 4 00 | | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Raymond & Ely, G. S. | Nev. | 5,000 | 3,000,000 | 30,000 | 100 | 540,000 | Dec. | 1876 | 1 00 | 3,075,000 | Sept. | 1873 | 3 00 | | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Ridge, C. | Mch. | ..... | 500,000 | 20,000 | 25 | 200,000 | ..... | ..... | ..... | 90,000 | Feb. | 1875 | 1 00 | | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Rye Patch | Nev. | 3,000 | ..... | ..... | ..... | 97,500 | Nov. | 1876 | 0 50 | 150,000 | Dec. | 1877 | 0 25 | | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| St. Joseph, L. | Mo. | 2,000 acs. | 1,000,000 | 100,000 | 10 | ..... | ..... | ..... | ..... | 250,000 | ..... | ..... | ..... | | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Savage, G. S. | Nev. | 800 | 11,200,000 | 112,000 | 100 | 3,650,500 | Jan. | 1878 | 1 00 | 4,460,000 | June | 1869 | 3 00 | | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Seaton, G. S. | Col. | 1,700 | 500,000 | 50,000 | 10 | * | ..... | ..... | ..... | 10,000 | May | 1877 | 0 10 | 12 | ..... | ..... | 2.35 | 2.45 | 2.35 | ..... | ..... | ..... | 2.40 | 2.35 | 2¼ | 2.20 | 1,000 | |
| Sierra Nevada, G. S. | Nev. | 3,650 | 10,000,000 | 100,000 | 100 | 1,000,000 | Jan. | 1878 | 0 50 | 102,000 | Jan. | 1871 | 1 00 | 10 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Silver King | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 200,000 | Feb. | 1878 | 0 50 | | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Standard | Cal. | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 300,000 | Feb. | 1878 | 1 00 | | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Yellow Jacket, G. S. | Nev. | 1,200 | 12,000,000 | 120,000 | 100 | 3,438,000 | Jan. | 1878 | 2 00 | 2,184,000 | Aug. | 1871 | 2 50 | | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |

### Non-Dividend Mines.

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Allouez, C. | Mch. | ..... | 1,000,000 | 20,000 | 50 | 940,000 | May | 1876 | 5 00 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Alpha, G. S. | Nev. | 300 | 3,000,000 | 3,000 | 100 | 210,000 | Aug. | 1877 | 1 00 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Am. Flag, G. | Col. | 5,300 | 600,000 | 60,000 | 10 | * | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 22c | ..... | 23c | 22c | 22c | ..... | 24c | 22c | 23c | 21c | 23c | 22c | 20,100 | |
| Bertha & Edith, G. | Vir. | 645 acs. | 3,500,000 | 350,000 | 10 | * | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 13c | 12c | 14c | 13c | 15c | 14c | 15c | 13c | 15c | 14c | 15c | 14c | 67,100 | |
| Best & Belcher, G. S. | Nev. | 545 | 10,080,000 | 100,800 | 100 | 337,792 | Aug. | 1877 | 1 00 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Bullion, G. S. | Nev. | 943½ | 10,000,000 | 100,000 | 100 | 2,802,000 | Jan. | 1878 | 1 00 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Caledonia, G. S. | Nev. | 2,188 | 10,000,000 | 100,000 | 100 | 1,435,000 | Oct. | 1877 | 0 75 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Cleveland, C. | Col. | 3,715 | 250,000 | 25,000 | 10 | * | ..... | ..... | ..... | ..... | Nov. | 1877 | | | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Cons. Imperial, G. S. | Nev. | 468 | 50,000,000 | 500,000 | 100 | 575,000 | Oct. | 1877 | 0 20 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Con. N. Slope & E. C. T. | Col. | 15,000 | 500,000 | 10,000 | 50 | * | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Dana, C. | Mch. | ..... | 500,000 | 20,000 | 25 | 68,000 | Jan. | 1863 | 0 50 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Dawson, S. | Ont. | ..... | 1,200,000 | 60,000 | 20 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Duncan, S. | Ont. | ..... | 1,200,000 | 60,000 | 20 | 75,000 | July | 1876 | 41⅔ | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Exchequer, G. S. | Nev. | 400 | 10,000,000 | 100,000 | 100 | 380,000 | Jan. | 1878 | 1 00 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Granville, G. | N. C. | 9,000 | 1,000,000 | 100,000 | 10 | * | ..... | ..... | ..... | 0 50 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Humboldt, C. | Mch. | ..... | 500,000 | 20,000 | 25 | 100,000 | Sept | 1876 | 0 15 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| International, S. | Ont. | ..... | 1,200,000 | 60,000 | 20 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Julia, G. S. | Nev. | 3,000 | 11,000,000 | 110,000 | 100 | 525,000 | Jan. | 1878 | 0 75 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Justice, G. S. | Nev. | 2,100 | 10,500,000 | 105,000 | 100 | 2,237,500 | Jan. | 1878 | 2 00 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Kings Mountain, G. | N. C. | ..... | 1,200,000 | 120,000 | 10 | * | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 2¼ | ..... | 2.65 | 2¼ | 65c | ..... | 2.20 | ..... | ..... | ..... | ..... | ..... | 1,200 | |
| Lacrosse | Col. | 3,900 | 1,000,000 | 100,000 | 10 | * | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 63c | 61c | 65c | 61c | 65c | 63c | 69c | 63c | 69c | 66c | 71c | 68c | 42,500 | |
| Lucerne | Col. | 4,200 | 5,000,000 | 500,000 | 10 | * | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Madison, C. | Mch. | ..... | 500,000 | 20,000 | 25 | 123,000 | Sept | 1876 | 0 10 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Mariposa preferred | Cal. | 44,387 | 5,000,000 | 50,000 | 100 | 1,425,000 | June | 1877 | 1 00 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 2¾ | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 100 | | |
| " common | acres. | ..... | 10,000,000 | 100,000 | 100 | 1,425,000 | June | 1877 | 1 00 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Memphis | Col. | 6,000 | 300,000 | 60,000 | 5 | * | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Mesnard, C. | Mch. | ..... | 500,000 | 20,000 | 25 | 160,000 | Apr. | 1876 | 0 50 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Mexican, G. S. | Nev. | 600 | 10,080,000 | 100,800 | 100 | 181,440 | Aug. | 1877 | 0 30 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Overman, G. S. | Mch. | ..... | 1,000,000 | 40,000 | 25 | 3,053,880 | Feb. | 1878 | 3 00 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Osceola, C. | Nev. | 1,200 | 3,840,000 | 38,400 | 100 | 2,567,880 | Nov. | 1877 | 3 00 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Petherick, C. | Mch. | ..... | 500,000 | 20,000 | 25 | 165,533 | Mar. | 1876 | 0 50 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Pleasant View, G. | Col. | 1,200 | 200,000 | 20,000 | 10 | * | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Quicksilver preferred | Cal. | 8,500 | 4,291,300 | ..... | ..... | * | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| " common | Cal. | acres. | 5,708,700 | 100,000 | 100 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 18¼ | ..... | 18 | 17¾ | 18⅜ | 18 | ..... | ..... | ..... | ..... | ..... | ..... | 410 | | |
| Rockland, C. | Mch | ..... | 500,000 | 20,000 | 25 | 495,000 | Jan. | 1874 | 1 00 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Seg. Belcher, G. S. | Nev. | 160 | 640,000 | 6,400 | 100 | 244,800 | Apr. | 1876 | 5 00 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Silver City, G. S. | Nev. | 3,900 | 6,310,000 | 63,100 | 100 | 15,775 | Nov. | 1875 | 0 25 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Silver Hill, G. S. | Nev. | 5,400 | 5,400,000 | 54,000 | 100 | 192,600 | Dec. | 1877 | 1 00 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Star, C. | Mch. | ..... | 500,000 | 20,000 | 25 | 265,000 | Mar. | 1876 | 0 50 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Superior, C. | Mch. | ..... | 500,000 | 20,000 | 25 | 340,000 | Mar. | 1874 | 0 25 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |
| Union Cons. G. S. | Nev. | 850 | 10,000,000 | 100,000 | 100 | 285,000 | Oct. | 1877 | 0 25 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | |

G. Gold. S. Silver. L. Lead. C. Copper. * Non-Assessable.

Total Assessment levied to date..... 50,928,210 | Total Sales of Coal Stocks for the week..... 157,886 shares.
Total Mining Dividends to date..... 217,825,832 | Total Sales of Mining Shares for the week..... 150,302 "

† A dividend of 3⅛ per cent. was declared on the preferred stock of this Co. in July.

This "registered dealer's" privilege is only offered to members of the New York Stock Exchange, and, in Boston, Philadelphia and Baltimore, to members in good standing of the Stock Exchanges of said cities.

Application for "registered dealer's" permits must be made to the President, and will be issued only on signature to a contract to maintain the rates of commission and to abide by the regulations of this Exchange and the decisions of the Arbitration Committee. (Form of agreement herewith.) And on the payment of ten (10) dollars in advance, for each six months' issue of said permit.

GEO. B. SATTERLEE, President.

In accordance with the action of the Governing Committee (February 28, 1878) there has been established a Registration for Stocks. Companies may contract with the President and Treasurer of the Exchange for registration.

The Registrar will countersign outstanding certificates only on the verification of the issuing company, and on future issues only on the presentation by the company of the cancelled certificates of like amount, and after the punching out of the registry countersign on the cancelled certificates.

The Registrar will have personal charge of the discreet and safe keeping of locked books of registry.

The Assistant Registrar will also countersign the certification under the same provisions.

The Chairman of the Finance Committee will monthly, or whenever said committee desire, provide an inspection and test of the accuracy of the registration.

In the absence of the Registrar or Assistant Registrar, the Treasurer or Chairman of a Standing Committee, will, under order of the Governing Committee, perform the duties.

Mr. George B. Satterlee (President) has been appointed Registrar, and Mr. J. Wyman Morris Assistant Registrar.

Notice is hereby given to shareholders of contracting companies, and to members of the Exchange, that while the Exchange uses care to establish trustworthy and well-guarded registration, it shall in no manner create any money-liability of this Exchange to any certificate-holder whatever, by reason of such registration.

(Signed) J. WYMAN MORRIS, Secretary.

FORM OF REGISTERED DEALER'S AGREEMENT.

The undersigned, ——, hereby agrees, to and with the President and Secretary of the New York Mining Stock Exchange, that, in consideration of the privileges of "Registered Dealer," enabling —— to contract with members of said Exchange to deal with —— at an abatement of one-half of the decreed current rates of commission of this Board, —— will maintain and collect from any customer for whom —— deals, or who may be directly or indirectly interested in such dealings, the full rates of commission established as aforesaid; and further, that —— will be subject to any and all regulations of this Exchange, pertaining to dealings in and deliveries of stocks. The penalty for breach of this contract shall be the forfeiture of the granted privileges, with ineligibility to future issue.

It is understood that Registered Dealers shall have standing before, and shall be amenable to call of the Arbitration Committee of this Exchange, and the action of said Committee shall be final. Pending action of the Committee, the license may be suspended if, in their opinion, the evidence offered warrants such action.

*The Silver King Mining Co.* has paid its February dividend of $50,000.

*The Black Bear Quartz Min'g Co.* has declared its usual monthly dividend.

*Assessments* with dates when delinquent: Jackson, 50c., March 25; Loretta, 25c., March 29; Independence, 15c., March 25; Pittsburg, 6c., March 30; Tuscarora, 15c., April 2.

The *Stock Report* of the 1st inst. publishes the following list of mining assessments delinquent during February:

| | Per Share. | Am't. | | Per Share. | Am't. |
|---|---|---|---|---|---|
| Bullion | $1.00 | $100,000 | New England. | 10 | 10,000 |
| North Cal | 10 | 5,000 | Oregon | 25 | 25,000 |
| Chollar-Potosi | 3.00 | 84,000 | Ophir | 1.00 | 100,800 |
| Crown Point | 1.00 | 100,000 | Rex Montes | 4.00 | 12,000 |
| Electric | 5 | 2,500 | Rock Island | 20 | 20,800 |
| El Dorado Slate | 30 | 3,000 | R'gh & Ready. | 10 | 10,000 |
| Exchequer | 1.00 | 100,000 | Savage | 1.00 | 112,000 |
| Gold Bar Gravel | 50 | 50,000 | Signal Silver | 50 | 50,000 |
| Golden Crown | 5 | 5,000 | Sierra Nevada | 50 | 50,000 |
| Gold Hill | 25 | 7,500 | Silver Prize | 10 | 10,000 |
| Homestake | 1.00 | 100,000 | South Barcelona | 20 | 12,000 |
| Hussey Con | 10 | 10,000 | South End | 20 | 20,000 |
| Ida Livingstone | 3 | 3,000 | South Standard | 10 | 10,000 |
| Iris | 10 | 10,000 | White & Shiloh | 50 | 50,000 |
| Julia Con | 75 | 82,500 | Woodville Con | 25 | 30,000 |
| Justice | 2.00 | 210,000 | Yellow Jacket. | 2.00 | 240,000 |
| Leviathan | 25 | 25,000 | Young America | 15 | 9,000 |
| Mint | 10 | 5,000 | | | |
| Modock Con | 50 | 50,000 | | | |
| Navajo | 40 | 40,000 | | | |
| Nevada | 10 | 4,000 | | | |
| New Coso | 50 | 50,000 | | | |
| Total | | | | | $1,818,000 |

### Gas Stocks.

NEW YORK, Friday Evening, March 8, 1878.

Gas stocks are very dull and unchanged. There is no demand. Transactions of any importance could only be made at a material concession on our quotations.

*Cheaper Gas Demanded in British Columbia.*—The *Victoria Colonist* of the 15th ult., says: "A special meeting of the City Council was held at the Council Chambers last evening to consider the gas question, when it was decided to offer the Gas Company $4 per lamp instead of $4.75 per month. There are some 57 lamps in use, and this reduction would enable the Council to erect more lamps to light wayfarers to their doors on dark nights. The company should accede to this moderate demand. The cost of gas at San Francisco is $3.50 per 1,000 feet. The coal from which that gas is made is brought from Nanaimo and elsewhere at considerable expense for freight and duty. The coal from which Victoria gas is made comes from Nanaimo, pays no duty, and very little for freight. Yet consumers here are charged $1.50 more per 1,000 feet than the San Franciscans!"

*Lighting a Colliery with Gas.*—The Manners Colliery Company, Ilkeston, England, have applied to the Ilkeston Local Board to lay in service pipes to supply their colliery with gas. The company are ready to use gas not only on the surface, but in the underground workings, and the board have agreed to lay in the gas main half the distance required, or 150 yards, on condition that the company lay in the other half, and use gas both underground and on the surface.

*Chippewa Falls (Wis.) Gas Light Co.*—$1,000 ($500 each) of the bonds of this company, secured by mortgage due 1886, 10 per cent. coupons A. & O., due on and from April, 1877, inclusive, sold at auction in Philadelphia during the week at 25 per cent.

*Washington (D. C.) Gas Light Co.*—50 shares of this company's stock, par $20, was sold at auction during the week at $48 per share.

*Portland, Oregon.*—$6 per 1,000 feet is charged for gas in this place.

*Salem, Oregon.*—$7.50 per 1,000 feet is charged for gas in this place.

*Seattle, Washington Territory.*—The rate charged for gas at this place is $7.50 per 1,000 feet.

*St. Louis Gas Light Co.*—We note recent quotations of this company's stock at $70@75—bid and asked.

*Halifax (N. S.) Gas Co.*—We note recent quotations of this stock at 152½ per share.

*Boston (Mass.) Gas Co.*—This company has declared a dividend of 2½ per cent., payable on demand.

*Cambridge (Mass.) Gas Co.*—We note recent auction sales of this stock at $36 per share.

*East Boston (Mass.) Gas Co.*—We note auction sales of the stock of this company at $35 per share.

| COMPANIES IN NEW YORK AND VICINITY. | Capital Stock. | Par. | DIVIDENDS. Rate per ann. | DIVIDENDS. Am. of last. | DIVIDENDS. Date of last. | QUOTATIONS Bid. | QUOTATIONS As'd |
|---|---|---|---|---|---|---|---|
| | $ | | P. ct. | | | | |
| Mutual, N. Y. | 5,000,000 | $100 | 10 | 2½ | Jan., '78 | 80 | 85 |
| " Gold Bds. | 90,000 | 1,000 | 7 | 3½ | Feb., '78 | 100 | 103 |
| N. York " | 4,000,000 | ..... | 10 | 5 | Nov., '77 | 115 | 120 |
| Metrop. " | 2,500,000 | 100 | 10 | 5 | Feb., '78 | 120 | 133 |
| " G. Certfs. | 1,000,000 | ..... | 7 | 3½ | " | 100 | 103 |
| " Gold Bds. | 500,000 | 1,000 | 7 | 3½ | Dec., '77 | 102 | .... |
| Harlem " | 1,850,000 | 50 | 8 | 3 | Feb., '78 | 90 | 95 |
| Manhat. " | 4,000,000 | 50 | ....‡ | 5 | " '78 | 200 | 204 |
| Brooklyn, Bkln. | 2,000,000 | 52 | 15 | 5 | Dec., '77 | 155 | 165 |
| Nassau, G. Bds. | 1,000,000 | 25 | ....‡ | 3 | Jan., '78 | 70 | 80 |
| " G. Certfs. | 700,000 | 1,000 | 7 | 3½ | July, '77 | .... | 101 |
| People's, G. Bds. | 1,000,000 | 10 | ....‡ | 3½ | July, '76 | 20 | 40 |
| " G. Certfs. | 300,000 | 1,000 | 7 | 3½ | July, '77 | 80 | 85 |
| " Gold Bds. | 325,000 | ..... | 7 | 3 | Feb., '77 | 96 | 100 |
| Metrop. " | 1,000,000 | 10 | 5 | 2½ | Nov.. '77 | 68 | 72½ |
| W'msb'g " | 1,000,000 | 50 | 10 | 2½ | July '77 | 100 | 110 |
| " G. Certfs. | 1,000,000 | ..... | 7 | 3½ | July '77 | 100 | 102 |
| Citizens', G. Bds. | 1,200,000 | 20 | ....‡ | 3 | Jan '78 | 81 | 85 |
| " G. Certfs. | 320,000 | 1,000 | 7 | 3½ | Oct., '77 | 97 | 100 |
| J. C., N. J. | 750,000 | 20 | 10 | 5 | July, '77 | 160 | .... |
| Cen. Wstch.N.Y. | 466,000 | 50 | 7 | 4 | July, '77 | 75 | 85 |
| Subur'n, " | 295,000 | 50 | 7 | 3½ | Oct., '77 | .... | 95 |
| Municipal, N.Y. | 1,500,000 | 100 | ..... | ..... | ..... | 90 | 100 |

‡ Paid irregularly.

NOTICE TO STOCKHOLDERS OF THE SCIENTIFIC PUBLISHING CO.—A special meeting of the stockholders of this company will be held at its offices, No. 27 Park Place, on Monday, the 18th inst., for the purpose of considering an increase of the capital stock from $50,000 to $75,000. AUSTIN GALLAGHER, Sec'y.

NEW YORK, March 8, 1878.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